

MODERN Machine Shop

OK series 3600

the **BLACK ANGUS** of face mills with...

More Beef in the Body



For the heaviest cuts that the biggest milling machines can pull.

OK Face Mills, size for size, have more weight, more substance, more beef in the body. And blades are huskier with a greater proportion of carbide available for cutting. It is a proven fact these cutters remove more metal in a given period than other cutters which are complicated and weakened by recesses for screws, pins, gibs or locking devices.

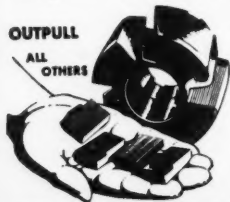
OK cutters consist of just two components—the body and the blades. Blades are simple wedge-

shaped* blocks, serrated on one face with matching serrations in the body. They are solidly seated by a driving fit, easily extracted with a drift, and stay put under the fastest speeds and heaviest feeds. The simple strength and ruggedness permit the placement of more blades in the fine pitch series and heavier blades in the coarse pitch series.

You need the OK competitive advantages. Take your toughest job and let OK engineers have a go at it.

OUTPULL

**ALL
OTHERS**



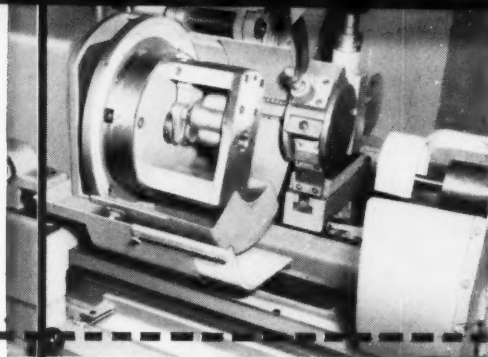
*The wedge is the world's simplest and strongest basic mechanical device

OK

**modern milling cutters
for modern milling machines**

THE O.K. TOOL COMPANY, INC.
MILFORD, NEW HAMPSHIRE

Heald Model 271 Size-Matic grinds **TWO OFF-CENTER BORES**



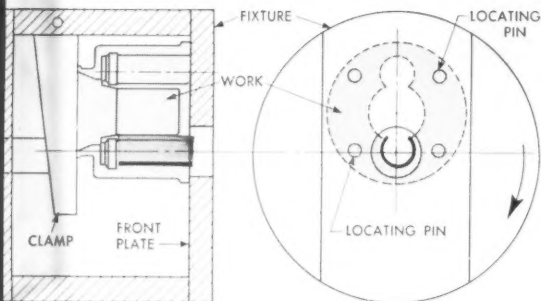
Universal joint body with double, open-sided bore, turned 180° in fixture for secondary grind

You can't grind two off-center holes in a rotating part at the same time. So you grind them in sequence. In such cases, it's important to have a work-holding fixture that permits fast, easy relocation of the part for the secondary grind. Here's a typical example.

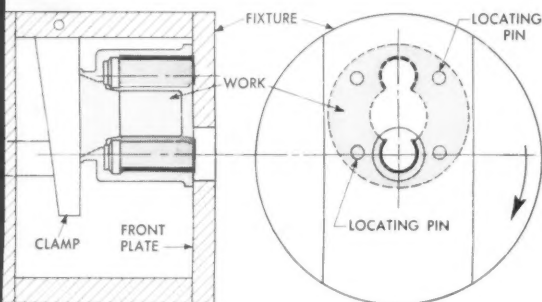
The machine, a model 271 Size-Matic, is designed for precision internal grinding of double open-sided bores in universal joint bodies. The work is hydraulically clamped in a quick-change, balloon type fixture. After the first bore is ground, the part is simply unclamped, turned 180° in the fixture, re-clamped and ground on the second bore. Note that the holes are open on one side, giving an interrupted surface for the grinding operation.

The part locates against the flange face and on pins through holes in the part.

Remember—when it comes to precision finishing, it pays to come to Heald.



Side and end view of clamping fixture with universal joint body in place. Color indicates surface ground in first operation.



Here part has been turned 180° in fixture and the second open-sided bore has been ground.



Case Study
No. 2236-97 in

**PRECISION
PRODUCTION**

INTERNAL AND ROTARY SURFACE GRINDING MACHINES AND BORE-MATICS

THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS

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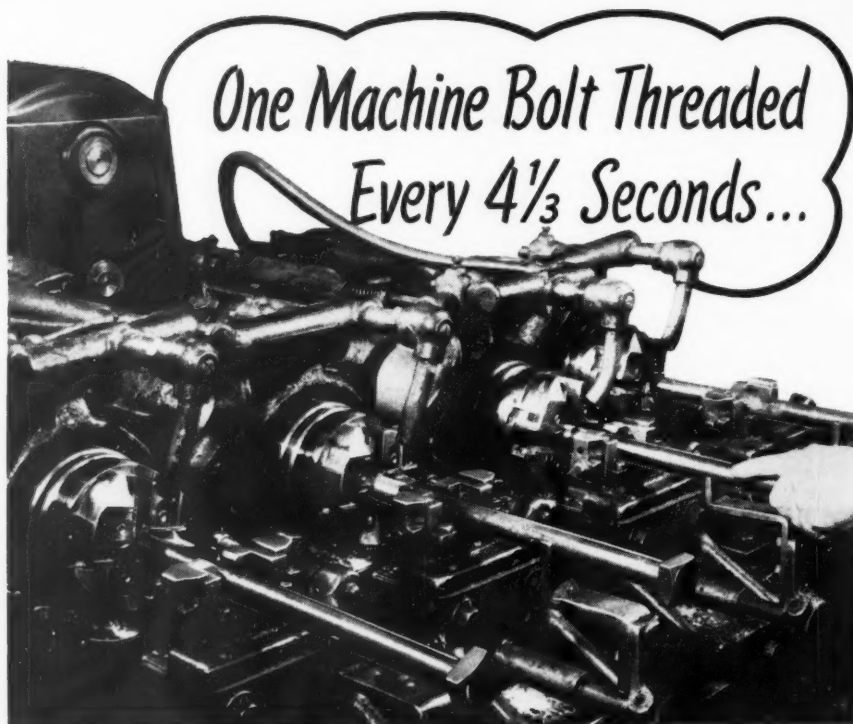
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Member



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with the **LANDIS** 4-Spindle Semi-Automatic Threading Machine

A single operator at the Pittsburgh Screw and Bolt Corporation produces an average output of 840 machine bolts per hour.

This operation requires the threading of 1" Square Head Machine Bolts from Commercial Steel blanks of 217/163 Brinell hardness. 1" 8 pitch USS threads are cut 2 3/4" long at a cutting speed of 44 surface feet per minute. Production is continuous and chaser cost is extremely low.

The use of the LANDIS Four-Spindle Machine allows the operator to surpass the output of four independent threading spindles. Operation is semi-automatic—the operator inserts the workpiece in the grips, which open and close automatically, and removes it when threading is complete. The die head automatically feeds onto the workpiece, opens automatically and is automatically withdrawn at the point when the desired thread length is completed.

Send specifications when writing for Bulletin #E-88-1

LANDIS Machine CO.



WAYNESBORO
PENNSYLVANIA



FAST CARBIDE TOOL GRINDING

For Fast Grinding of Carbide and High Speed Tools,
HAMMOND 14" GRINDERS
are the Choice of America's Leading Manufacturers . . .



MODEL 14-WD
Wet or Dry

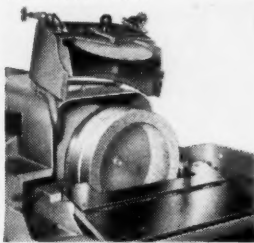
Note these PLUS FEATURES . . .

- Two operators can grind tools with freedom of movement
- "No Spray—No Splash" guards (Patented)
- Safety cup wheel disc (Patented), prevents dropping tools into wheel cup
- Easy and quick wheel change
- Tables adjust "in and out" by hand crank to compensate for wheel wear
- Wet or dry—or CO₂ carbon dioxide
- Oversize, ball bearing, precision spindle with multi-V-belt drive
- Heavy machine tool construction—net weight 2250 lbs.

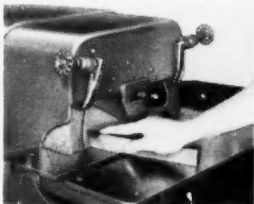
There are over 6000 Hammond Carbide Grinders in service! Write for Catalog No. 225 showing America's most complete line of Carbide Tool, Chip Breaker and Diamond Finishing Grinders.



NO SPRAY—NO SPLASH (Patented) Swivel guard closes one side of wheel while other is in use, permitting freedom of movement and unobstructed vision.



EASY WHEEL CHANGE, by removing two cap screws and raising Wheel Hood on top, allowing easy access to wheel. Spout connections do not require disconnecting.



SAFETY CUP WHEEL DISC (Patented) closes cup of wheel, preventing hand injuries or dropping tools into cup of wheel.

Hammond Machinery Builders

1615 DOUGLAS AVENUE • KALAMAZOO, MICHIGAN

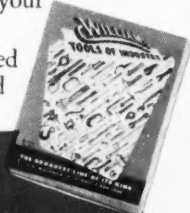
Try the **BALANCED STRENGTH** of a New **WILLIAMS** "SUPERRENCH"

Only by using one of the new Williams "Superrenches" can you get the true feel of its exceptional balance and strength, so important on jobs ranging from delicate to the most severe. In designing these wrenches for greatest possible working efficiency, Williams redistributed the weight . . . made the heads slimmer and the handles longer and narrower. You'll find them more serviceable where clearances are limited. And, because they are drop-forged from carefully selected alloy steel . . . they'll take hard service longer.

Williams NEW streamlined "Superrenches", with double head, open ends are available in a full range of 15° angle opening combinations. Order a supply from your Williams Distributor.

The full line of Williams Tools is illustrated and described in Catalog 201. May we send you a copy?

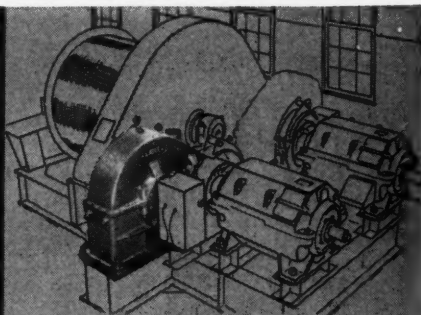
Be Wise . . . Buy
WILLIAMS
INDUSTRIAL TOOLS



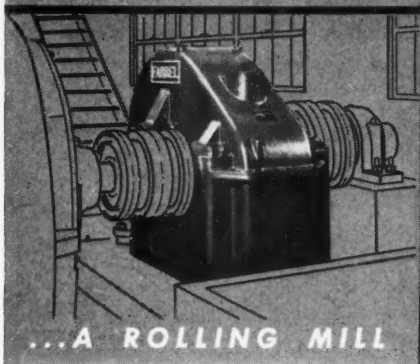
THROUGH YOUR DISTRIBUTOR

J. H. WILLIAMS & CO. • 498 Vulcan Street • Buffalo 7, N. Y.

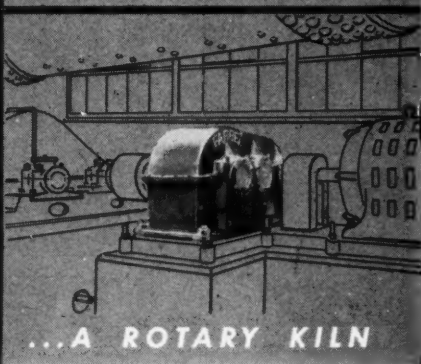
WHAT THE
Design Flexibility
 OF
FARREL® SPEED REDUCERS
 MEANS TO...



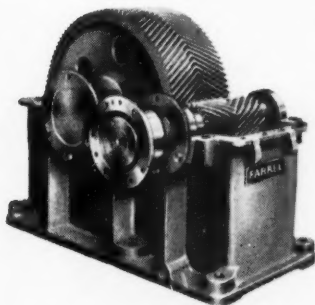
...A SKIP HOIST



...A ROLLING MILL



...A ROTARY KILN



Design flexibility means the same thing in each of these applications: *a speed reducer that meets the drive requirements exactly.*

Farrel speed reducers, unlike most "standardized" products, are standard only in their principal features. They are adaptable in critical detail. Gears, shafts, bearings, and even some housing dimensions, can be proportioned to meet specific load, speed and service requirements. This flexibility has resulted in the solution of innumerable application problems.

Write for further details of these problem-solving units. Ask for a copy of Bulletin 449.

FARREL-BIRMINGHAM COMPANY, Inc., Ansonia, Conn.

Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
 Sales Offices: Ansonia, Buffalo, New York, Boston, Pittsburgh, Akron, Detroit, Chicago, Memphis, Minneapolis, Portland (Oregon), Los Angeles, Salt Lake City, Tulsa, Houston, New Orleans.

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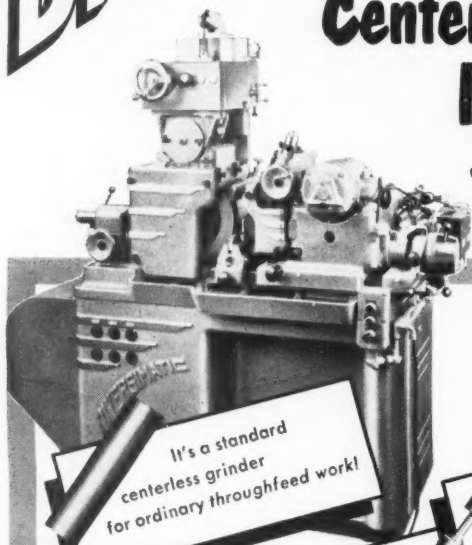
April, 1953

MODERN MACHINE SHOP 5

DIVERSIMATIC

is **THREE**
Centerless Grinders
IN ONE!

**... No Change-over
Time!**



It's a standard
centerless grinder
for ordinary throughfeed work!

It's a standard
centerless grinder
for infeed jobs!

The DIVERSIMATIC gives you the
facilities of *three* separate
machines for the cost of one!

It's equipped with a
Crush Forming Attachment for
form grinding and profile work!

You can do any one of these three important
jobs with practically no change-over time!

Your Crush Dresser is as handy as a lathe taper
attachment... *it's there when you need it, out of
the way when you don't... and it opens a whole
new world to centerless grinding possibilities!*

If you grind externally
consider DIVERSIMATIC
... equipped with the
spindle that
needs no warm-up!

Get DIVERSIMATIC facts
from our folder! Free copy.



DIVERSIFIED METAL PRODUCTS CO.
2838 Leonis Boulevard • Los Angeles 58, California

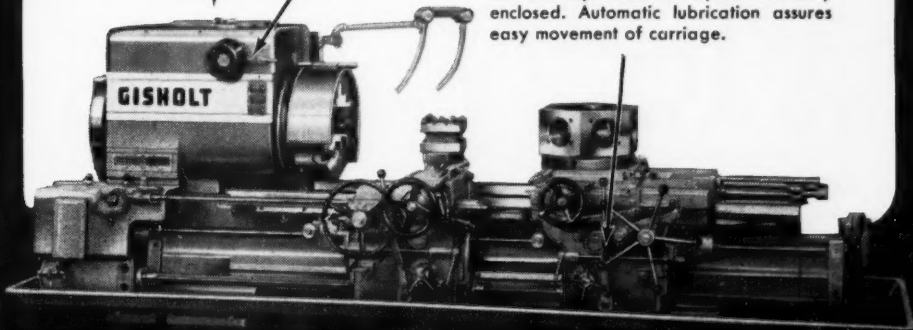
GISHOLT'S *easier operation*

saves you time and money...



This 21,000 lb. machine requires no more operating effort than turret lathes $\frac{1}{3}$ its weight. Despite its great power and rigidity for heavy-duty work, the new Gisholt 4-L is so fast and responsive, it can handle light work of both large and small diameters. With many machine functions entirely automatic, waste time is eliminated. Fatigue is reduced to a new minimum. Training time is shortened. Operator output is faster—more nearly constant throughout the day.

- 1** **Hydraulic Speed Selector** eliminates manual gear shifting. Spindle speed changes are made instantly by power without stopping the spindle or releasing the main drive clutch. Can be operated either direct or pre-set.
- 2** **Central control panel** eliminates manual effort. Provides responsive finger-tip, push-button control for start, stop, reverse, inching, chucking, and coolant supply. Automatic braking brings the work smoothly and quickly to rest.
- 3** **Easy selection of feeds** is provided in the new single dial type feed selector control, making a complete choice of feeds immediately available. Aprons are fully enclosed. Automatic lubrication assures easy movement of carriage.



The new Gisholt 4-L Saddle Type Turret Lathe provides $31\frac{3}{8}$ " swing over the ways, 27" swing over carriage wing, $9\frac{1}{2}$ " to $12\frac{1}{2}$ " spindle bores and 63" longitudinal working travel of turret carriage to accommodate an unusually wide range of work. Ask Gisholt engineers about this modern, easier operating Gisholt as applied to your specific machining requirements. New literature is available.

GISHOLT

MACHINE COMPANY



THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

DIVERSIMATIC

is **THREE**
Centerless Grinders
IN ONE!
... No Change-over
Time!



The DIVERSIMATIC gives you the facilities of *three* separate machines for the cost of one!

It's a standard centerless grinder for ordinary throughfeed work!

It's equipped with a Crush Forming Attachment for form grinding and profile work!

It's a standard centerless grinder for infeed jobs!

You can do any one of these three important jobs with practically no change-over time!

Your Crush Dresser is as handy as a lathe taper attachment...it's *there when you need it, out of the way when you don't...*and it opens a whole new world to centerless grinding possibilities!

If you grind externally consider DIVERSIMATIC ...equipped with the spindle that needs no warm-up!

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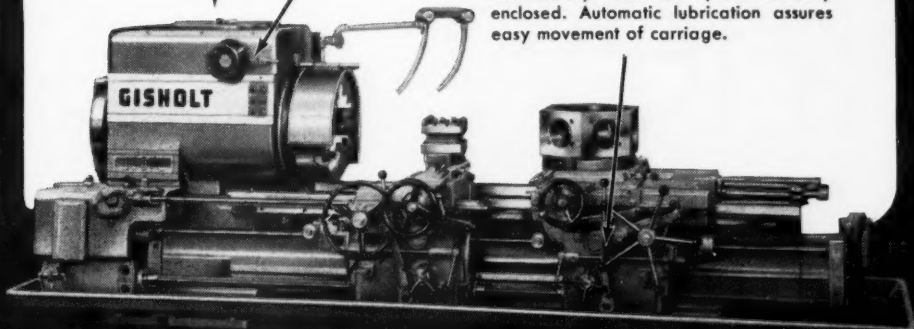
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GISHOLT

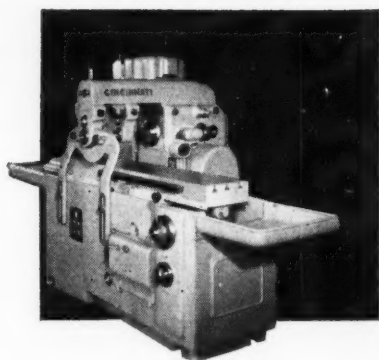
MACHINE COMPANY



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Madison 10, Wisconsin

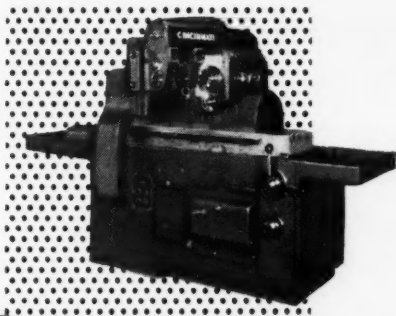
TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES



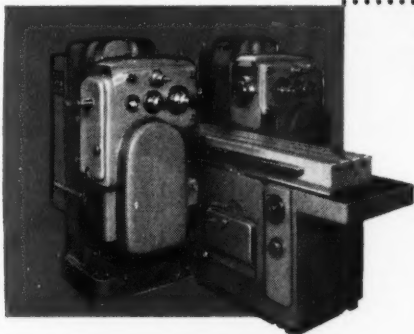
Plain style, new CINCINNATI
No. 2-24 Automatic
Milling Machine

a **new** milling machine
bearing a world renowned name

MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES



**Plain Rise and Fall style,
new CINCINNATI No. 2-24
Automatic Milling Machine**



**Duplex style, new CINCINNATI
No. 2-24 Automatic
Milling Machine**

CINCINNATI. . .

You can always look to Cincinnati Milling for the finest in machine tools. Cincinnati's newest is the No. 2-24 Automatic, an outstanding example of fine engineering and workmanship, combining advanced production features and easier, more convenient means of setting up the job. ¶ There are three styles: Plain, Duplex, and Plain Rise and Fall. All have two-way table feed cycles with cycle selector control; automatic backlash eliminator; automatic spindle stop; Dynapoise overarm. You may obtain complete information by writing for 28-page catalog No. M-1760. Brief data in Sweet's Catalog File for Mechanical Industries.

**THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO**



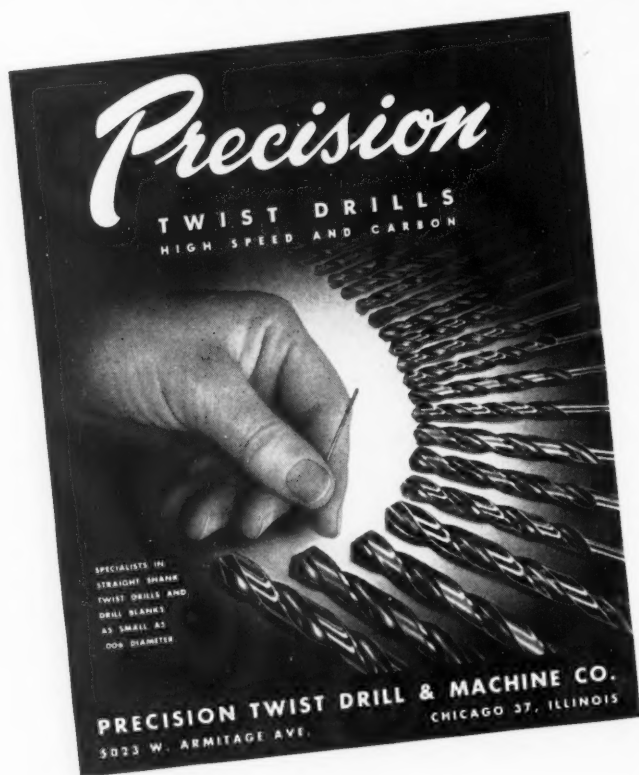
OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID

April, 1953

CINCINNATI

MODERN MACHINE SHOP 9

For the Finest Small Twist Drills



Write for this New Catalog and Price List

"Any Precision made drill or tool must not only be entirely satisfactory to you, but must prove to be the most economical you have ever used or it can be returned for full credit."

THIS IS OUR GUARANTEE!

PRECISION TWIST DRILL & MACHINE CO.

5023 W. ARMITAGE AVE.

CHICAGO 37, ILLINOIS

SOME DESIRABLE TERRITORIES OPEN FOR DISTRIBUTION.

Precision + Speed + Power

... THIS VERSATILE MACHINE
CAN REPLACE 2 OR MORE
SINGLE-PURPOSE MACHINES



KNIGHT'S
No. 50

Vertical Milling & Precision Boring Machine

A single solid-base machine with every essential feature for milling and accurate boring—an extremely versatile machine that will do the work of 2 or more single-purpose machines.

Work transfers are entirely eliminated
Set-up time is reduced to a minimum

Table feeds 5/16" to 20" per minute plus rapid traverse in all directions. 16

Spindle speeds from 40 to 2000 r.p.m.
and infinitely variable boring
feeds from .0005" to .010".

Convenient quick-action
controls—full-vision work
areas—easy operation.
Powerful all-gear 7½ H.P.
drive—extra-rugged
construction.

Write For Catalog

— ATTACH TO COMPANY LETTERHEAD —

W. B. KNIGHT MACHINERY COMPANY
3922 West Pine, St. Louis 8, Mo.
Send catalog on No. 50 and other Knight
Milling Machines.

NAME

TITLE

☐ Send information on Knight's 20" & 42"
Rotary Tables.



W. B. KNIGHT MACHINERY CO.
3922 WEST PINE BOULEVARD • ST. LOUIS 8, MISSOURI

April, 1953

MODERN MACHINE SHOP 11

through
modern design ...
**WORK
BENCHES**
at savings
of up to **40%**

and better quality, too!

New Sturdi-Bilt exclusive patented "Tension Bolting" revolutionizes work bench construction! Assures rigid, vibration-free frames, economical shipping, mass production and low cost. New type Sturdi-Bilt tops are warp and splinter-proof, dent and abrasion resistant, have twice the hardness of hardwoods, adjustable legs. Available with or without drawers in four sizes. For full details, specifications, prices, write for special Bulletin 326.



**USED AND APPROVED
BY LEADING COMPANIES**

Both Sturdi-Bilt work benches and the Shop Tender are being ordered and re-ordered in ever-increasing quantities by the Blue Book of American industry.

As Tool Tender
for machine units



For Maintenance
or Repair Work



For Laboratory
or Mailing Room



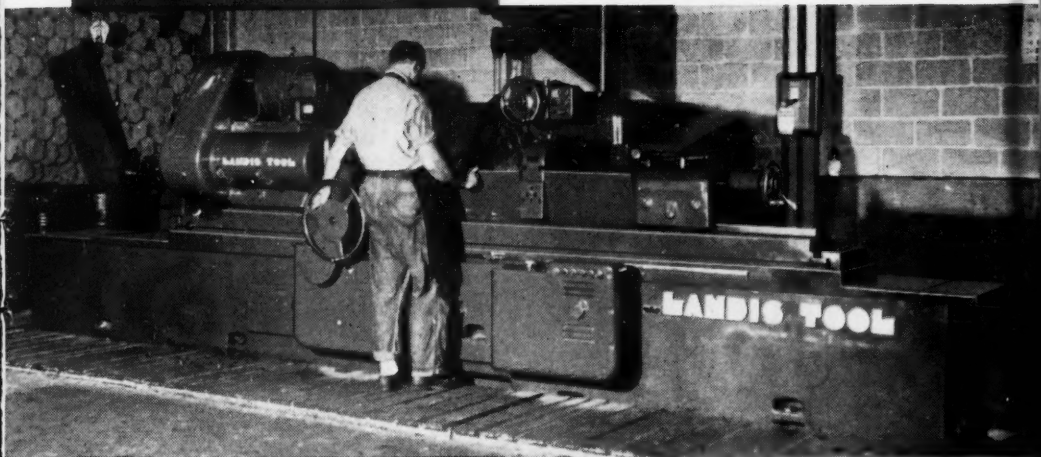
Available
with or
without
tough,
long-wearing wood top

Versatile "Shop Tender"

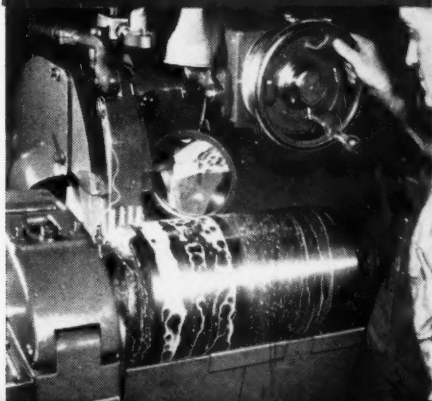
Here's the perfect all 'round auxiliary bench. Mobile, convenient, sturdy, low cost—saves hundreds of steps; speeds up work and production. Adjusts to nine different heights. Has handy tool tray and steel drawer. Lower drawer and top frame are "Tension Bolted" for permanent rigidity. Available with wood top (24" x 24" x 1 5/8") with drop sides and back—or steel trays; 3" diameter hard rubber wheel sets or caster sets. Choice of 12 models. For full details, specifications, prices, write for special Bulletin No. 326-B.

Sturdi-Bilt
Steel Products, Inc.

624 S. MICHIGAN AVE. • CHICAGO 5, ILLINOIS



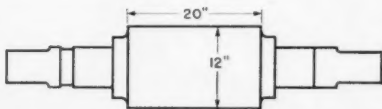
Landis Roll Grinder Regrinds Cold Strip Mill Rolls in 20 Minutes



The tremendous forces exerted between the rolls and strip in a cold rolling operation, not only shape the material to a desired dimension, but wear and scour the rolls. These rolls must be reground to restore the smooth surface and dimensional accuracy.

At the Signode Steel Strapping plant in Baltimore, a new Landis 20" x 96" Roll Grinder is used for this operation. Average floor-to-floor time is 20 minutes including set-up and grinding time. Ease of set-up and convenient grouping of controls makes this production possible.

This is another example of the production and operating advantages of Landis Grinders which can be economically applied to your grinding operations. Landis Tool Company, Waynesboro, Pennsylvania.



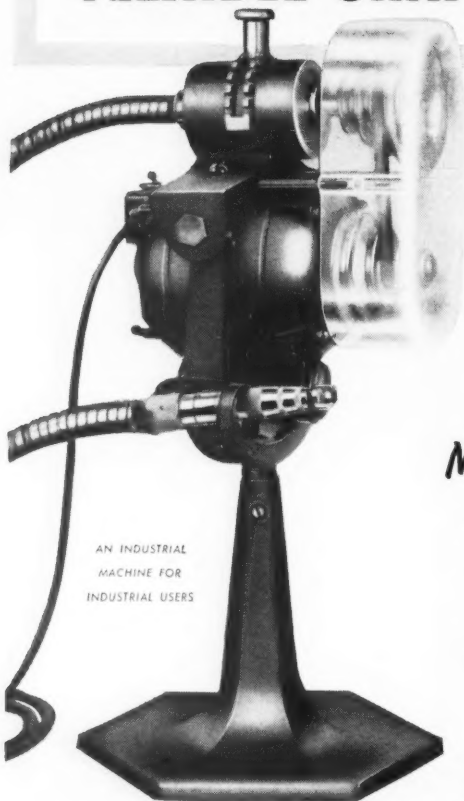
Work Data

Machine	Landis 20" x 96" Type FR Roll Grinder
Stock Removal	.005" on diameter
Crown	.002" on diameter
Finish	Good commercial
Time	20 minutes floor-to-floor

LANDIS

precision grinders

POWERFUL FLEXIBLE SHAFT MACHINES



AN INDUSTRIAL
MACHINE FOR
INDUSTRIAL USERS

TAPPING ATTACHMENTS · TAPS · FLEXIBLE SHAFTS
AND MACHINES · ROTARY FILES · TUNGSTEN CARBIDE
REAMERS AND MILLS · DRILLS · BORING BITS

Jarvis POWER TOOLS

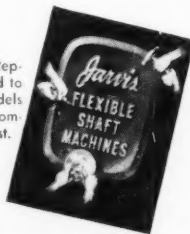
by
Jarvis

Do Your Jobs

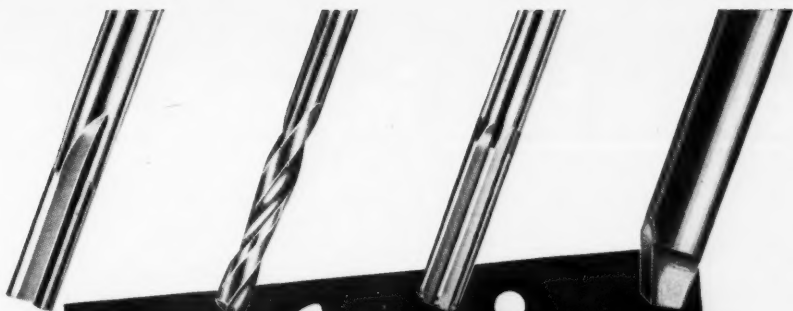
**EASIER--FASTER--
MORE ECONOMICALLY!**

Whether your operations call for GRIND-
ING, CUTTING, BUFFING, SANDING or
ROTARY FILING, Jarvis Flexible Shaft
Machines are available in BENCH, FLOOR
or OVERHEAD Types—in Single or Mul-
tiple Speeds to suit your Individual
Requirements.

A Jarvis Factory Trained Rep-
resentative will be pleased to
assist you in selecting models
best suited to your use. Com-
plete catalog upon request.



THE CHARLES L. JARVIS CO.
MIDDLETOWN IN CONNECTICUT



Jarvis

SOLID TUNGSTEN CARBIDE TOOLS

INDUSTRIAL TOOLS FOR INDUSTRIAL USERS

PRECISION MACHINE GROUND-FROM-THE-SOLID

Consistent Excellent Performance—Unusual Economy and Ultra Precision work has firmly established Jarvis Solid Tungsten Carbide Tools among users who know quality.

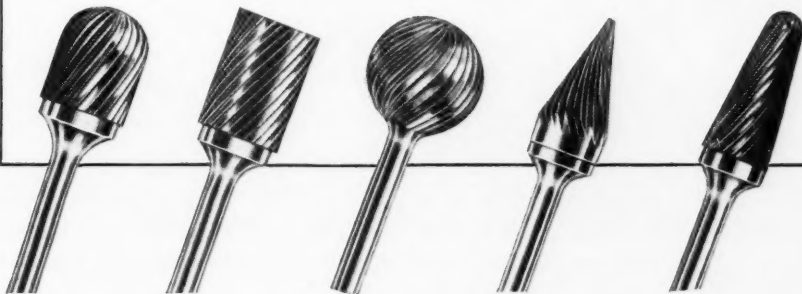
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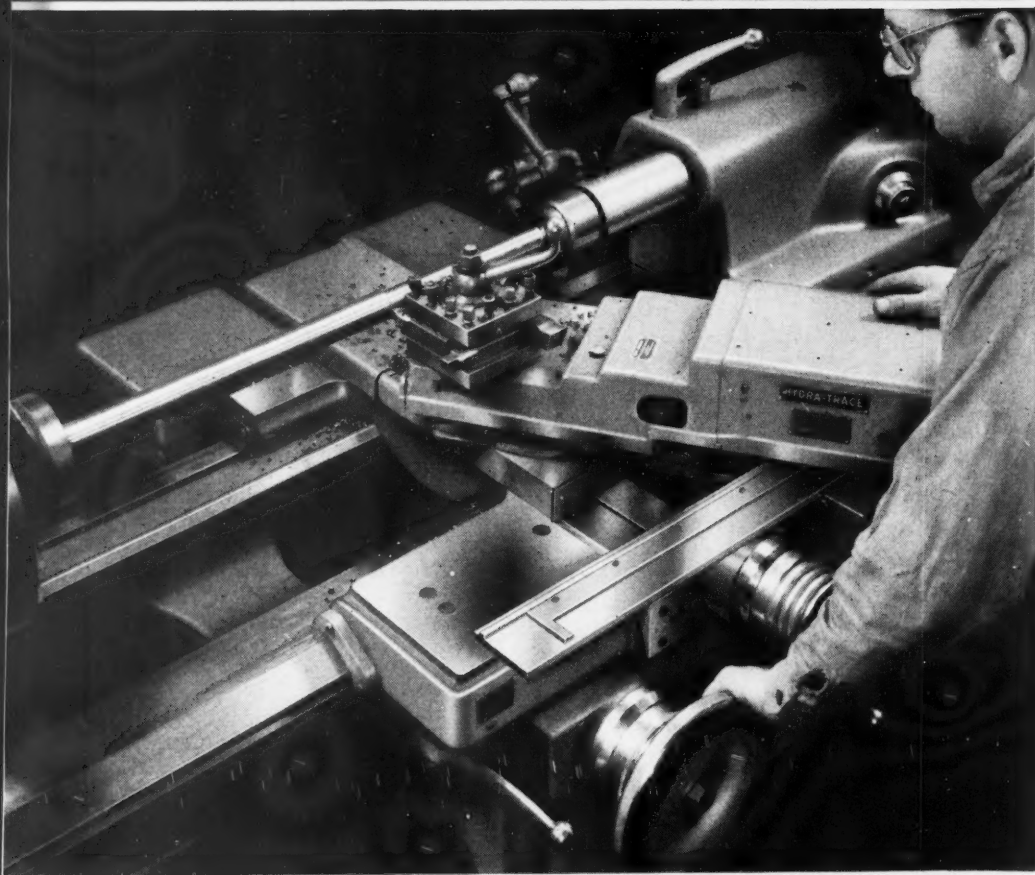


THE CHARLES L. JARVIS CO., MIDDLETOWN IN CONNECTICUT



NOW SCULLY-JONES TURNS

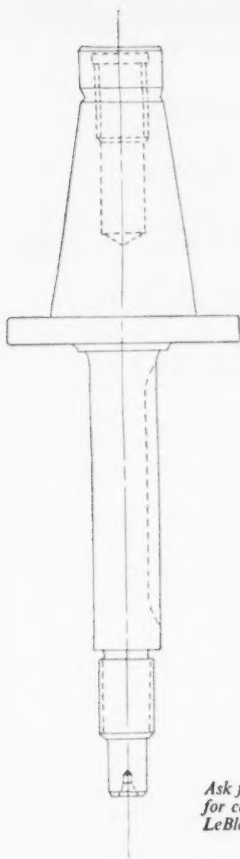
four arbors instead of 3...



Hydra-Trace (Trade Mark, Registered U. S. Pat. Off.) is LeBlond's heavy-duty hydraulic tracing attachment. It can be mounted in place of the compound rest on practically all LeBlond lathes built since 1935.

same time, same lathe...

plus "Hydra-trace"*



Ask for Bulletin HT2A
for complete details on
LeBlond Hydra-Trace.

turned faster by

When defense needs mushroomed demand for production equipment, Scully-Jones & Co. of Chicago found itself jammed with orders for milling machine arbors (they make more arbors than anyone else). Acting on advice from engineers at LeBlond's Chicago Office, Scully-Jones added Hydra-Trace to their LeBlond 16" RT Engine Lathe. Now they turn out four arbors in the time formerly needed to produce three—same lathe, plus Hydra-Trace.

Besides boosting output, this template-controlled hydraulic tracer saves 45% on set-up time, gives uniform precision without the need of a highly-skilled operator.

Stepless form-turning, contour facing, and turning step shafts are all in a day's work for Hydra-Trace. Fits all LeBlond Engine Lathes built since 1935, can be mounted easily in a matter of minutes. Templates are flat, compact, suitable for both rough and finish turning. They can be produced readily in your own plant, stored in limited space.

When turning requirements call for increased output—with present machines or with new equipment—you'll find just what you need in LeBlond's complete line of lathes and lathe attachments.

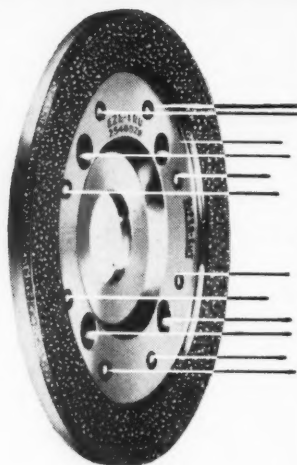
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THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

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You can align this Diamond Wheel Quickly!



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EZE-true feature
on Super-Cut
Wheels save time
and diamonds
assures better
finishes...**

Every Carbide tool grinding shop needs this!

This patented EZE-TRU Diamond Wheel eliminates need for shimming up low spots when back plates are out of alignment. Has eight auxiliary tapped openings fitted with small screws. Selective tensioning of these screws against back plate quickly and easily brings wheel into true alignment. This insures accurate wheel installations which grind faster, give better finishes and prolong wheel life.

Send for Price List and full details...

This EZE-TRU feature can be supplied on 6", 7" and 10" diameter, shallow or plain cup type wheels. For prices and full details, write to:

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Super-Cut Distributors, Inc. MMS4
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Gentlemen:

Please send me full information and prices on your line of EZE-TRU Diamond Wheels

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extend the usefulness of your drill presses and band saws. Reduce material spoilage, prevent tool damage...*save money*. Insure fast, safe, accurate work.

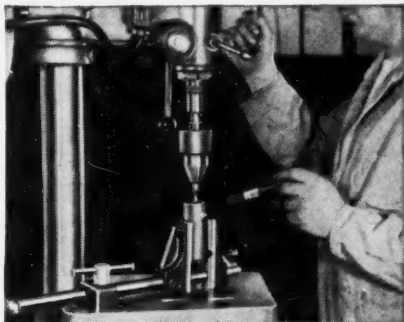
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is a full-floating vise for *all* set-ups in tool rooms and production. Locks instantly anywhere on table... becomes a dependable drill jig. Turns over on three sides for maximum flexibility. Eliminates time-wasting clamps, straps, bolts.

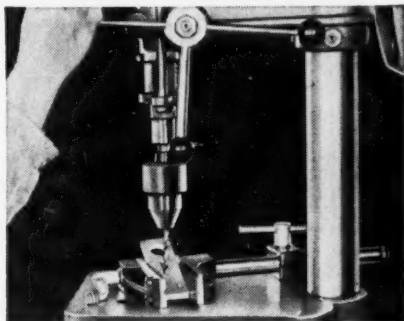
FOR YOUR BAND SAW, Float-Lock

safely and securely holds all shapes and thicknesses of materials. Cutting to close tolerances made easy without hands touching material...simplifies compound angle cutting. Ideal for automatic chain-feed operation.

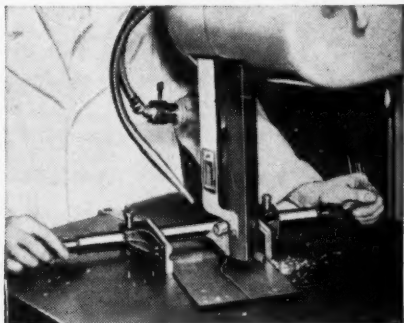
Order from **your industrial supply distributor** and write for illustrated folder to: Wahlstrom/Float-Lock Sales Dept., American Machine & Foundry Company, 511 Fifth Avenue, New York 17, N. Y.



Ideal for centering and end drilling



Perfect for angle drilling



Cutting irregular shapes made easy

When you want on any cutting-tool

here are 5 reasons to call your

MORSE- Franchised DISTRIBUTOR

● **COMPLETE LINE:** Drills, Taps (including a new line of Special-Purpose Taps . . . and 7 new basic and conversion sets of Taps and Dies, handsomely boxed), Dies, Reamers, Cutters, End Mills, Counterbores and Countersinks.

● **AMPLE STOCKS:** Your Morse-franchised Distributor is ready to supply you with the Morse Quality Cutting Tools you need. *New Morse methods of production, inventory control and expediting put him in a far stronger position in '53 than ever before.*

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ACTION!

problem...

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*Buy them by phone
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ordering time*

April, 1953

MODERN MACHINE SHOP 21



...but

Experience Cannot be Copied

More than a quarter-century ago MARVEL invented and basically patented the MARVEL High-Speed-Edge Hack Saw Blade—the UNBREAKABLE blade that increased hack sawing efficiency many-fold.

Every MARVEL Hack Saw Blade ever sold has been of that basic welded high-speed-edge construction, with constant improvements from year to year, as EXPERIENCE augmented the "know-how" . . .

MARVEL is not "tied" to any single source of steel supply, and has always used the best high speed steels that became available from time to time as metallurgy progressed. When—and if finer steels are developed—and are proven commercially practical for welded-edge hack saw blades—MARVEL will use them, regardless of cost or source . . .

There is only one genuine MARVEL High-Speed-Edge! All other "composite" or "welded-edge" hack saw blades are merely flattering attempts to imitate—without the "know-how" of MARVEL EXPERIENCE . . .

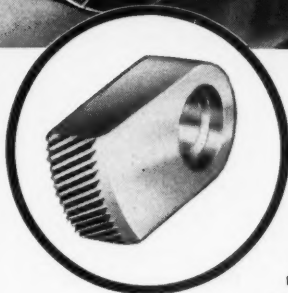
Insist upon *genuine* MARVEL High-Speed-Edge when buying hack saw blades—and be **SAFE**, for you can depend upon MARVEL. They have been "tested", "pre-tested", and "re-tested" by thousands of users for more than a quarter-century!



ARMSTRONG-BLUM MFG. CO. • 5700 Bloomingdale Ave. • Chicago 39, U. S. A.

SENECA FALLS *Automatic* WORK DRIVER

*Drives Anything
Between Centers*

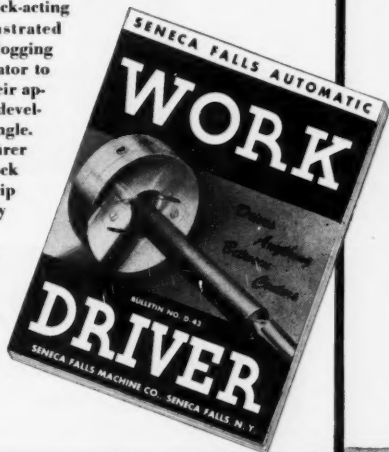


Jaws with angular serrations ... NOW STANDARD

● These self-centering, quick-acting Drivers have long demonstrated their ability to eliminate dogging time and to enable one operator to attend multiple machines. Their application has been widened with devel-

opment of a new jaw having serrations milled at a suitable angle. These angular serrations provide an overlapping contact for surer and quicker grip on smooth finished, as well as hot rolled stock and forgings having a relatively hard surface. This positive grip eliminates slippage and resultant tool breakage... especially important when costly carbide tools are used.

Seneca Falls Work Drivers are designed for use on any engine or multiple-tool lathe and for certain work on turret lathes and grinding machines. In addition to time-saving, the Seneca Falls Automatic Work Driver provides greater safety for the operator since there are no projecting screws or sharp corners to catch clothing or injure hands. Made in 18 standardized models for work diameters ranging from $\frac{1}{4}$ to 6 $\frac{1}{2}$ inches. Write for Bulletin D-43.



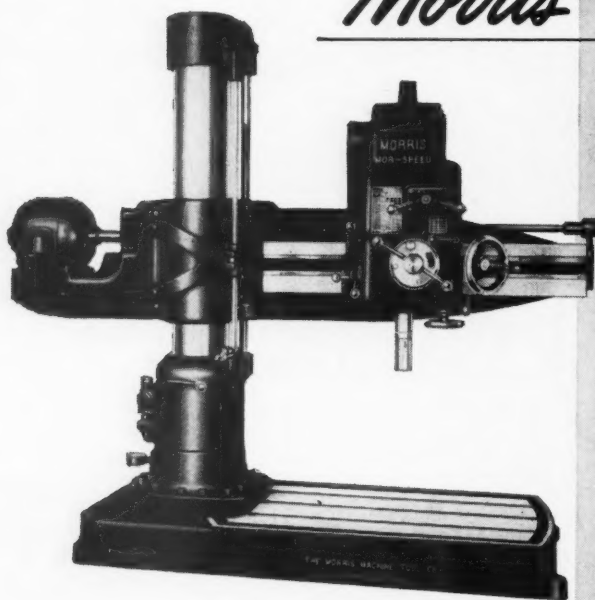
SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.



drill....ream....tap....FASTER, EASIER!

Morris

**MOR-SPEED
RADIAL DRILLS**



Designed to set a cost-killing pace in the race for profitable production, MORRIS Mor-Speed RADIAL DRILLS offer a long list of outstanding features:

- * Centralized Controls—Reduce time between cuts.
- * Variety of Speeds and Feeds—Better selection of the right combination for every job.
- * Automatic Lubrication—Saves wear, insures accuracy.
- * Greater Strength, Rigidity and Balance—Provide greater machining precision.
- * More Automatic Stops—Save time and reduce manual control.

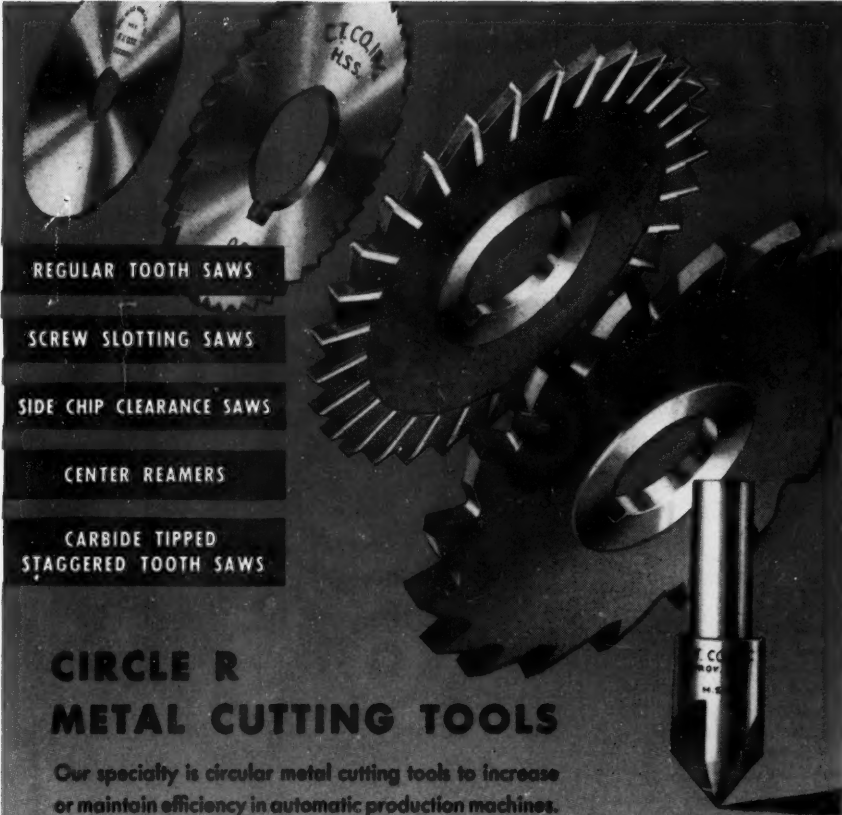
If you're interested in removing metal faster, write for your copy of the new MORRIS Mor-Speed RADIAL DRILL catalog.

a better
product
at less cost
with precision
PLUS production



Morris

THE MORRIS MACHINE TOOL COMPANY, 934 HARRIET ST., CINCINNATI 3, OHIO



REGULAR TOOTH SAWS

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Our specialty is circular metal cutting tools to increase or maintain efficiency in automatic production machines. We knew our business when we set up shop thirty years ago — and we've been refining our skills ever since.

Circle R tools are made in a wide range of most-used sizes — and special sizes or designs will be made up promptly on your order. Write for details, or look us up in the phone book and talk with our nearest representative.

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PRE-SELECTIVE SPINDLE SPEEDS
TURRET TYPE AUTOMATIC INDEXING
DRILLING AND TAPPING MACHINE**

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IN ONE**

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Burgmaster

Designed for...

**HIGHER PRODUCTION WITH GREATER
ACCURACY AT LOWER COST
PER PIECE MACHINED**

The No. 2 Model A BURGMASER will definitely cut your second operation costs because: Loss of time due to movements of parts from one spindle to another are eliminated; Close tolerances on size and concentricity are easily maintained; Set-up is simple and fast — unskilled operators can run the machine; Less floor space and power required; Rigidity, power and spindle speeds permit the use of high cutting speeds.

Now equipped with Warner electric clutch units in speed change mechanism.

- ★ ¼" Drill Capacity
- ★ ½" Tap Capacity
- ★ 1 to 2 H.P., 2 speed, 3 phase, 60 cycle Motor
- ★ 12 Spindle Speeds, ranging from 225-3000 R.P.M
- ★ 4 Speeds, pre-selective per spindle, at any one setting
- ★ 8" Ram Feed
- ★ 19" Table Travel
- ★ Throat Depth—11-5/16"
- ★ Spindles Mounted on Class "O" Timken Bearings

- ★ Power Index, utilizing Geneva Mechanism
- ★ Individual Depth Stops
- ★ Completely Enclosed Gear Box
- ★ Table work surface—17"x33"
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- ★ Floor space required— 36"x 48"
- ★ Extremely close tolerance can be held

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SINCE 1880

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bryant internal grinding



no. 1309-W

Finishes 2 bores and a taper straight and concentric. 2 wheelheads are used on this semi-automatic. Max. traverse stroke, 6". Max. grinding length, 3½".



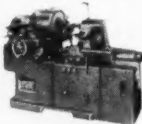
no. 1109

For high production of small bores where accuracy of size and finish are required. Max. traverse stroke, 6". Max. grinding length, 3½".



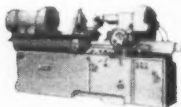
no. 2209

For precision and high production grinding of ball bearing races, gears, rolls, bushings, etc. Max. traverse stroke, 6". Max. grinding length, ¾".



no. 1116

A general purpose hole grinder for tool room, small shop, or general production. Maximum traverse stroke, 20". Maximum grinding length, 8".



no. 1416

Specially designed for grinding bores in long work, such as machine tool spindles. Maximum traverse stroke, 20". Maximum grinding length, 8".



no. 1209

A fully automatic, high production machine for small and medium bore grinding. Max. traverse stroke, 6". Max. grinding length, 3".

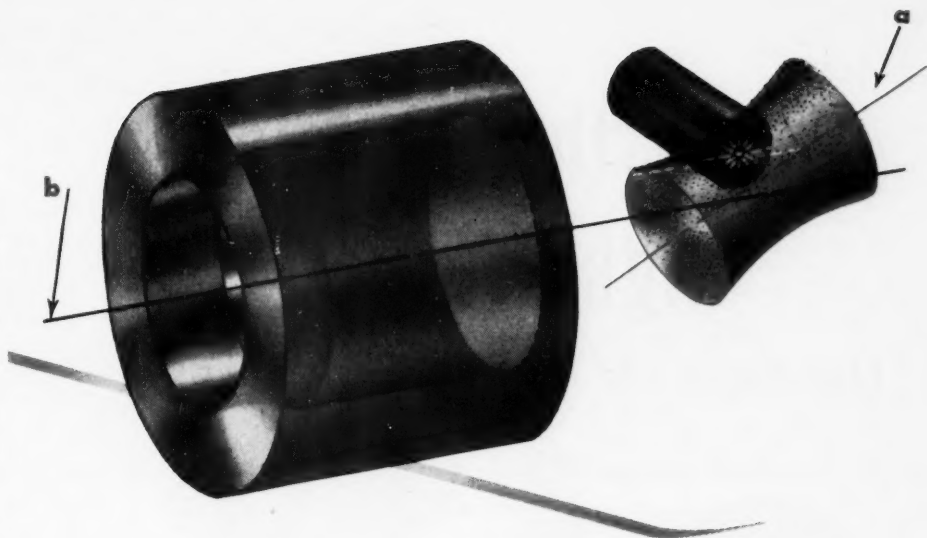


no. 1460

For production or single piece hole grinding on parts up to 60" diameter. Max. traverse stroke, 21". Max. grinding length, 16".

"alignment"
for better
internal grinding??

"Alignment for Better Internal Grinding", a new, sound color moving picture is available for free showing to engineering groups. Write for descriptive booking form.



It is generally believed in internal grinding that once the grinding wheel passes the diamond, the form of the wheel will be a perfect cylinder. In our illustration the wheel is tipped as it passes the diamond and an hourglass form is generated on the wheel. This condition is not peculiar to an internal grinder. The same form is generated in turning an O.D. on a lathe if the tailstock is either high or low.

The path of the diamond is a straight line across the surface of the wheel, but the wheel will not contact the work on the same straight line. Contact may be at a point on each end of the wheel. Since the wheel does not contact across its full face, wheel wear will be excessive and the wheel will act soft.

The geometry of the hole may be upset as in the illustration, with the result that the back of the hole will be tight. Neither turning the workhead nor changing the length of traverse will correct this error. Because the wheel is contacting at either one or two points, instead of a straight line, the surface finish will be poor. The remedy is to correct the alignment by bringing the wheel center line "a" parallel with the path of the wheel and in plane with the work center line "b".

Bryant Chucking Grinder Company

Springfield, Vermont, U. S. A.

Internal grinders • Internal & External thread gages

When the Decision's High Precision

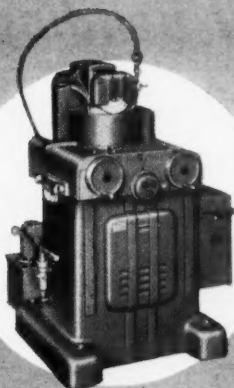
Use these TAFT-PEIRCE Machines to—

**Increase
Accuracy**

T-P #1 Surface Grinder.

Grinds surfaces to an accuracy, flatness, and finish formerly considered difficult or impossible. Full ball bearing construction provides extreme precision with almost effortless operation. Vernier attachments make horizontal and vertical settings to 0.0001". Tilting Wheel-head speeds and simplifies setups.





Reduce Grinding Time

T-P 6" Rotary Surface Grinder.

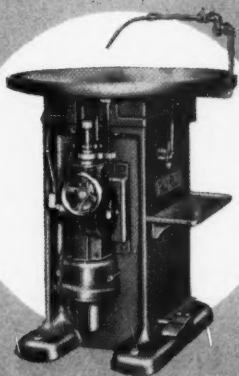
Developed for our own shops to provide high precision easier and faster than ever before. Tilting Wheelhead tips 30 degrees below wheel center . . . locks accurately in any position. Superpower magnetic chuck turns through 15 degree angle. Vernier feed permits .0001" vertical settings.



Lower Lapping Costs

T-P 24" Rotary Lapping Machine.

Offers a fast, accurate way to obtain superfine finishes and true contact surfaces. Low in original cost, economical to operate, it has the speed and capacity for rapid processing in small lot manufacture or tool room work. Available with plain plate for cylindrical work, grooved plate for flat work.



Eliminate Complex Tooling

T-P Back Spot Facing Machine.

Simplifies counterboring or backfacing bosses that are hard to get at. Circular 31½" work table has hole which allows shank of inverted counterbore to project through table. Groove in table collects coolant. Cutter speeds 170 to 300 rpm.; ½ HP motor.

For the complete story on these items and many more, get your copy of the New Taft-Peirce Handbook.

THE TAFT-PEIRCE MANUFACTURING COMPANY • WOONSOCKET, RHODE ISLAND



*T-P means
Top Precision*

"Buffalo"

Tips on Metal Bending

PROBLEM: Bend commercially perfect circles, arcs or spirals at a profitable production speed from any of these standard sections:

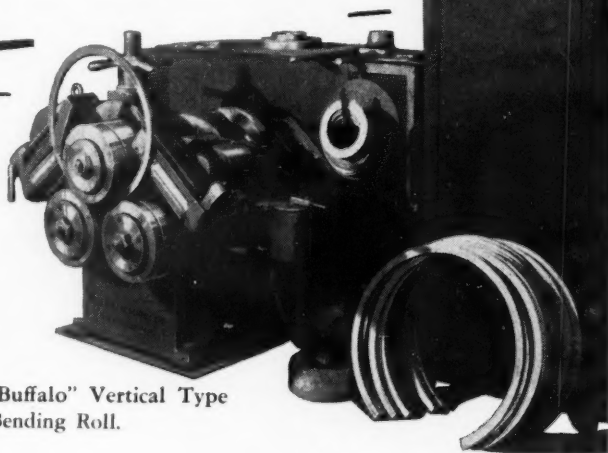
- | | |
|--------------------------------|-----------------------|
| 1. Angles, leg-out | 7. Rounds |
| 2. Angles, leg-in | 8. Squares |
| 3. Beams on flanges | 9. Copper tubes |
| 4. Channels, flanges in or out | 10. Standard St. pipe |
| 5. Flats on edge | 11. X heavy pipe |
| 6. Flats on flat | 12. XX heavy pipe |

SOLUTION: Use a "Buffalo" Bending Roll. It handles all these jobs and more, faster and cheaper than any other method.

"Buffalo"

**BENDING
ROLLS CAN
SAVE YOU
MONEY!**

Why not write for
Bulletins 3344-A
and 352-B
today?



"Buffalo" Vertical Type
Bending Roll.



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BUFFALO FORGE COMPANY

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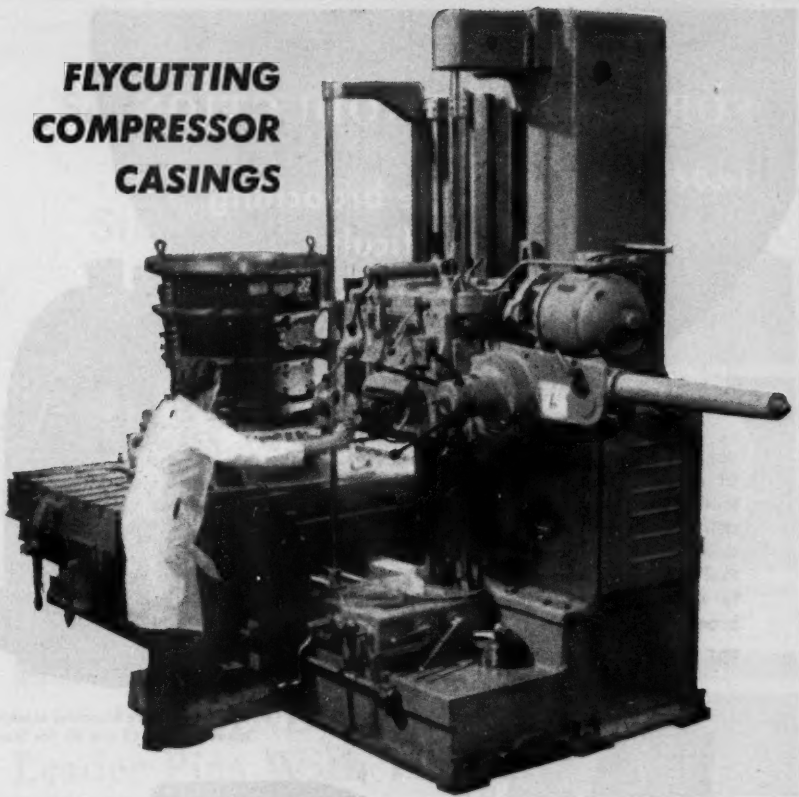
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FLYCUTTING COMPRESSOR CASINGS



on the

ORENDA JET ENGINE

at A. V. Roe Canada, Ltd., Malton, Ont.

A total of ten Cincinnati Gilbert horizontal boring mills have been installed at A. V. Roe, and four more are on order. These fast modern machines fit the demand imposed by the Orenda Jet Engine production program: high production and accuracy in the extreme. They are delivering the kind of service that supports the statement: "Those who buy Gilbert buy Gilbert again."

Whatever your boring mill or radial drill requirements may be, you'll be well advised to investigate the productive capacity of Cincinnati Gilbert machines. Our representative is always at your service.



THE CINCINNATI
GILBERT
MACHINE TOOL COMPANY

3366 BEEKMAN STREET • CINCINNATI 13, OHIO

April, 1953

MODERN MACHINE SHOP 33

FOR HIGHER PRODUCTION

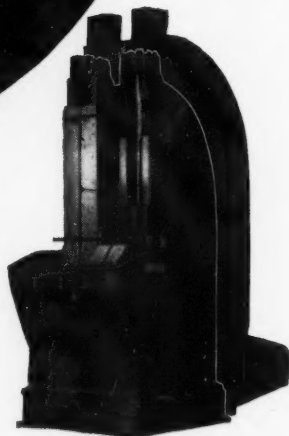
investigate... surface broaching
for difficult
machine work



● Many types of work can be surface broached on Footburt machines at remarkable savings over previous machining methods. High production is obtained with required accuracy and finish. Holding fixtures are designed for quick, convenient loading. Cutting tool maintenance costs are low. We will be glad to work with you on the application of surface broaching.

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio

Detroit Office: General Motors Building



● Duplex Surface Broaching Machine
Made in 5, 10, 15 and 25 Ton Sizes.



● Single Slide
Surface Broaching
Machine.
Made in 5, 10, 15
and 25 Ton Sizes.



● Continuous Type Broaching
Machine. Made in 4 Sizes.

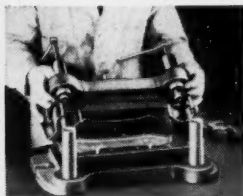
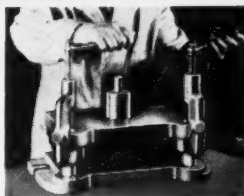
FOOTBURT

S U R F A C E B R O A C H I N G

Separate Die Sets This Fast, Simple Way...

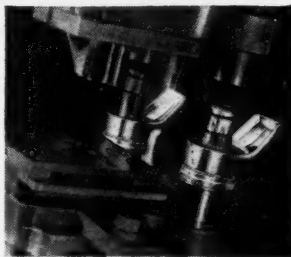


The principle of the Acro Die Set Puller is to remove the punch holder from the die shoe by a straight upward pull, whereby punch holder travels upward from die shoe axially, leaving both leader pins simultaneously. This is accomplished only by use of the indexed screw wrenches which act as indicators, controlling the upward travel. This is an exclusive patented Acro feature, found only in Acro Die Set Pullers.



AND, Protect Leader Pins With These Efficient Oilers

Acro Pin Oilers fit over each leader pin and seal in place with a rubber neoprene washer. Each cup is filled with oil so each downward stroke brings bushing in contact with oil and each upward stroke distributes oil evenly over leader pins. Eliminate bushing wear, leader pin scoring, and maintain die accuracy. Die sets equipped with Acro Pin Oilers have run under tests for several weeks to a month without refilling.



Free Data

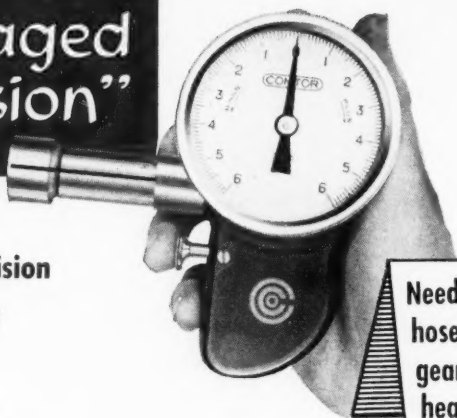
Covering each of these and other profitable Acro accessories is included in our folder. Write for bulletin MM.

ACRO

Metal Stamping Co.
334 EAST RESERVOIR AVENUE
MILWAUKEE 12, WISCONSIN

"Packaged Precision"

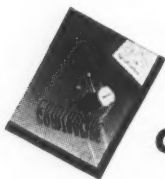
**Measures high-precision
holes to fractions of
.0001", with
these advantages ---**



**Needs no wires
hose, electronic
gear or
heavy base**

Here in a compact self-contained unit, you have the high precision that has found so prominent a place in the jet engine program. By unique design, Comtorplug gives true 2-point gaging, self-aligned and centered. Thus it enables you to check any part of a hole—including very bottom—detecting out-of-round, front or back taper, bell mouth, etc.

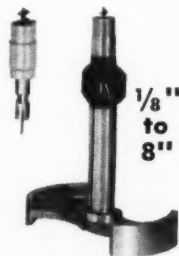
- There are no gimmicks to get out of order, such as wiring, hose or electronic gear. And because self-contained Comtorplug has none of these, and no heavy base, it is instantly usable anywhere: machine, bench, or lab.
- Shows actual measurement to fraction of .0001", and is "just right" for Statistical Quality Control programs.
- No skill needed to use it accurately—built-in features and 10 minutes' instruction do the trick.
- Marvelous thing about Comtorplug from production man's viewpoint is that you can put it to work in your shop without any planning, wiring, air lines or rigmarole—just a simple briefing on its use.
- Comtorplug is a rugged, shock-proof instrument. Use it for size control at the machine as well as bench inspection, wherever you produce precision holes in volume.

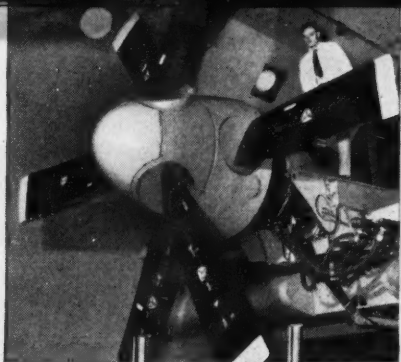


REQUEST BULLETIN 46

COMTOR CO.

64 FARWELL STREET
WALTHAM 54, MASS.





High speed aircraft propeller on test stand—built from tools "spotted in" in a DANLY SPECIAL DIE SET.



DANLY SPECIAL DIE SET, 46 by 140 inches, used for both production and checking of aircraft propeller tools.



DANLY SPECIAL DIE SETS



Final checking of a brazing fixture after "spotting in" to the master. A bridge gage is used with a series of templates as shown.



DIE SETS AND DIEMAKERS' SUPPLIES

DEPENDABLE FOR ACCURACY

Here's proof . . . this Danly Special Die Set is used by one of the country's leading aircraft propeller manufacturers for "spotting in" all contour tools for a complete production line. Accuracy is a must because the tools, masters for duplicating planers and profilers as well as holding fixtures, must mate closely with the master pattern and with each other in the sequence of operations.

Dependable accuracy makes Danly Special Die Sets ideal for applications of this kind . . . and rugged construction makes them last longer, too, on any job. That's why leading diemakers everywhere prefer Danly Die Sets!

DANLY MACHINE SPECIALTIES, INC.

2100 South Laramie Avenue • Chicago 50, Illinois

DANLY SPECIAL DIE SET SERVICE [S FAST AND CONVENIENT—CALL YOUR NEAREST DANLY BRANCH

- *CHICAGO 50.....2100 South Laramie Avenue
- *CLEVELAND 14.....1550 East 33rd Street
- *DAYTON 7.....3196 Delphos Avenue
- *DETROIT 16.....1549 Temple Avenue
- *GRAND RAPIDS.....113 Michigan Street N.W.
- *INDIANAPOLIS 4.....5 West 10th Street
- *LONG ISLAND CITY 1.....47-28 37th Street
- *LOS ANGELES 54 Ducommun Metals & Supply Co.,
4890 South Alameda
- MILWAUKEE 2.....111 East Wisconsin Avenue
- *PHILADELPHIA 40.....511 W. Courtland Street
- *ROCHESTER 6.....33 Rutter Street

*Indicates complete stock



Push-button brushing deburrs 1400 parts per hour

The Problem

here was to remove feather burrs from a machined slot in aluminum ammunition components . . . fast. By a hand method, output was only 360 per hour and results were not uniform.

With the help of the Osborn Brushing Analyst, the company built the rotating fixture shown above, equipped with three Osborn Masters Wheel brushes. Parts are placed on pins on clockwise-rotating table. Brush A, rotating clockwise, deburrs the corner of one side of slot. Brush B, rotating counterclockwise, deburrs the other side corner. Brush C deburrs the bottom corner. Slots come clean and smooth . . . at a rate of 1400 per hour!

Find out how power brushing can improve your product deburring, cleaning and finishing! Call the OBA or write The Osborn Manufacturing Company, Dept. M-2, 5401 Hamilton Avenue, Cleveland 14, Ohio.



Brushes A and B deburr side corners. Brushes rotate at 3450 rpm.

Osborn Brushes

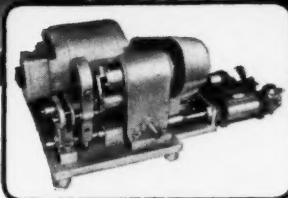
OSBORN POWER, MAINTENANCE AND PAINT BRUSHES AND FOUNDRY MOLDING MACHINES

You can NOW speed
 deburring, chamfering, pointing,
 facing, center-drilling, and
 reaming operations

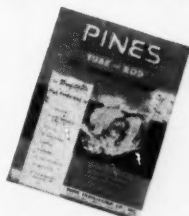


PINES END-FINISHING MACHINES

Handle broad range of rod, tube, and pipe end-finishing work with speed and precision. Exclusive chuck feature clamps and feeds work to cutters in one motion. Operator always has one hand free for stock handling. Designed with quick interchangeable tool holders and chuck inserts, 8-speed sheave — 760 to 3920 r.p.m., hardened and ground spindle, grease-sealed precision bearings. Automatic swing-type stock stop assures fast, accurate positioning. Entire unit is portable, takes up small space, handles stock diameters up to 2". Max. feed is 1 1/4". Larger sizes up to 5" capacity available. **Typical production: 800 tube ends per hour.**



(Above) Pines 2" High Production End-Finishing Machine equipped with foot-controlled air operating cylinder. Clamp, feed, and return cycle is automatic. Operator has both hands free for stock handling. Supplied similar to hand-operated unit.



PINES

ENGINEERING CO., Inc.

Specialists in Tube Fabricating Equipment

644 WALNUT • AURORA, ILLINOIS

Write for Free Bulletin

Write today for free bulletin and learn how these machines are built to save time on a wide range of work.

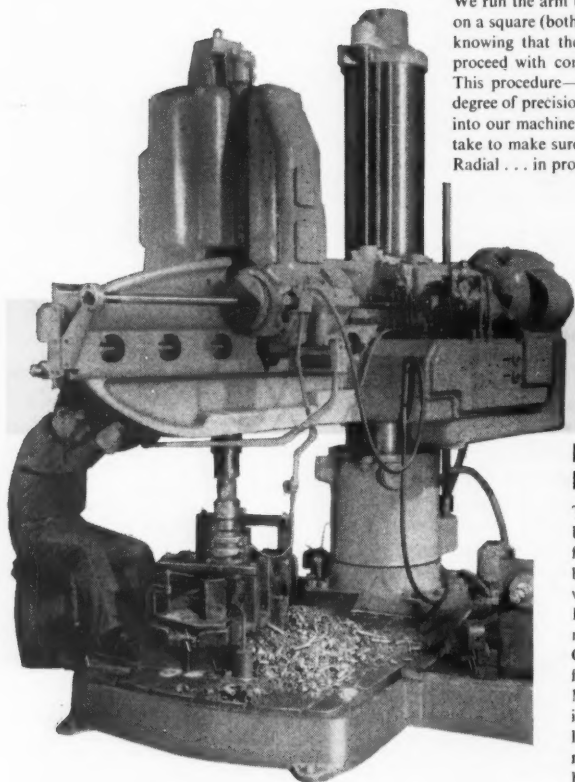


*Here's another reason
it pays to get a proposal
from Fosdick*

Fosdick aligns the column

Radial alignment at Fosdick starts with the column. We run the arm up and down with an indicator bearing on a square (both lengthwise and across the base). Then, knowing that the column is square with the base, we proceed with conventional tramping and sweep tests. This procedure—used only by Fosdick—adds an *extra* degree of precision to the extra rigidity we have designed into our machines. It's another example of the pains we take to make sure you get the most out of your Fosdick Radial . . . in production, tool life, finish, tolerance.

*Fosdick Hydraulic Radials are available
with 3' to 8' arms, 11" to 19" columns.
For full information, ask for Bulletin HRS.*



to give you

Fosdick takes a "bite" out of boring time at Owen Bucket

Tough cast-steel hinges for clamshell buckets are bored to $\pm .001$ " for a press-fit cast iron bushing—then counter-bored for a washer. For this and a variety of other heavy-duty drilling, Fosdick's proposal on a 5' 17" Radial made sense. Now Owen Bucket Co. of Cleveland gets 10 pieces in the time formerly needed to produce 7. As Frank Matisak, General Superintendent puts it, "... now we can do more pieces with longer tool life—this machine is more rigid, giving us closer tolerances and better finish."



First

precision production like this

Need Drilling Equipment? Get a Proposal from Fosdick!



Radial Drills



Jig Borers



Sensitive and
Upright Drills



Sensitive
Radial Drills



Automatic Positioning
Machines

FOSDICK

THE FOSDICK MACHINE TOOL CO., CINCINNATI 23, OHIO

For Making Dies by Sawing and Filing The PROVED Way Is With **Oliver** Die Making Machines

Efficient, Speedy and Accurate
Save Time and Costs Up to 60%

Simple to Operate . . .

Skilled Labor Not Required

Be Wise, OLIVERize Your Toolroom



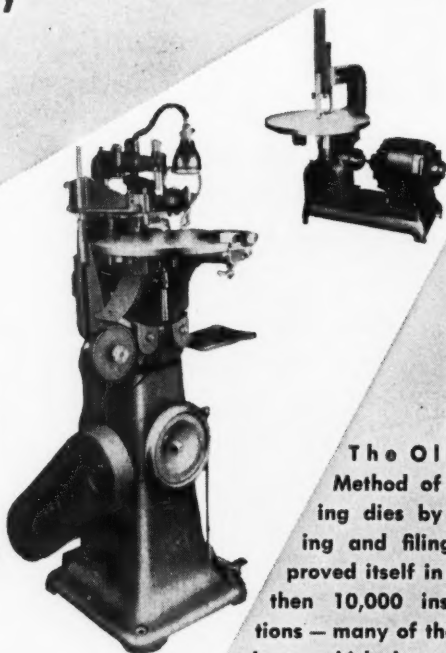
OLIVER DIE MAKERS Available in 5 Models

The Bench Model S-1 (illustrated) is a single speed die maker for use on tool steel up to 1" thick.

The Heavy Duty Model (illustrated) has 6 speeds, works in metal up to 3" thick, has variable strokes to 5" with hydraulic feed.

Write Today For Complete Technical Data on
OLIVER DIE MAKERS

See our catalog in Sweet's Directory



The Oliver Method of making dies by sawing and filing has proved itself in more than 10,000 installations — many of them in plants which have kept OLIVERS in continuous use for more than 25 years.

These long-lasting Oliver die Making Machines effect savings in time and costs up to 60%. They're efficient, speedy and accurate — simple to operate — don't require skilled labor.

MACHINE TOOLS by OLIVER include:

AUTOMATIC DRILL GRINDERS
TOOL & CUTTER GRINDERS
DRILL POINT THINNERS
TEMPLATE TOOL GRINDERS
FACE MILL GRINDERS
DIE MAKING MACHINES

OLIVER INSTRUMENT CO.

1430 E. MAUMEE • ADRIAN, MICHIGAN

A MOVABLE HORIZONTAL SURFACE

for YOU



UP

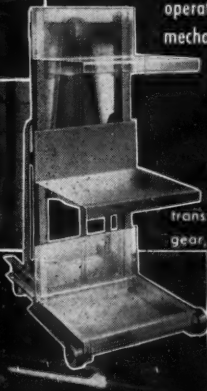
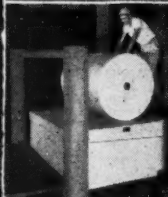
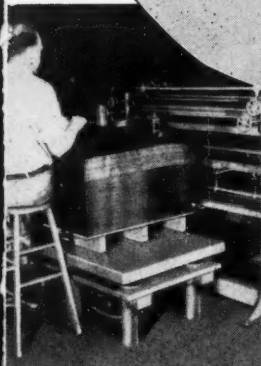
REMOVE

PORTELVATOR[®]

(The Handy Hamilton Portable Elevating Table)

DOWN

FETCH

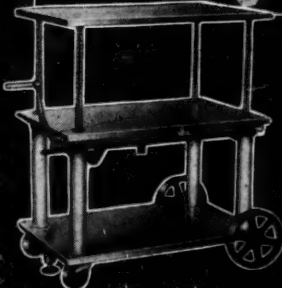


● In hundreds of spots throughout your operation you are required to lift or lower, take or fetch. Tools and dies must move from storage to machine—from machine to storage. Materials must be positioned. Machines must be fed.

Consider this fact! You can accomplish many industrial movements better and cheaper with Portelvator, the handy Hamilton portable elevating table, than with any other means or device regardless of cost. Take another look at your operation, then take a look at the exclusive mechanical lift principle which is employed in all Portelvator applications. Write for free bulletin P-5309.

Portelvator[®] employs an exclusive mechanical lift principle based upon power transmission through meshing worm, worm gear, and screw. Load capacities to 20 tons.

Stationary or portable. Power operated or manual. Push button controlled or completely automatic. Vertical movement to 10 ft. Table sizes to suit requirements. Tilt tops. Flat tops. Roller tops. — Take another look at your operation . . . and at Portelvator. Write now!



THE *Hamilton* TOOL COMPANY

828 SO. NINTH STREET • HAMILTON • OHIO • U. S. A.

**INCREASES
PRODUCTION...**

LOWERS COSTS...

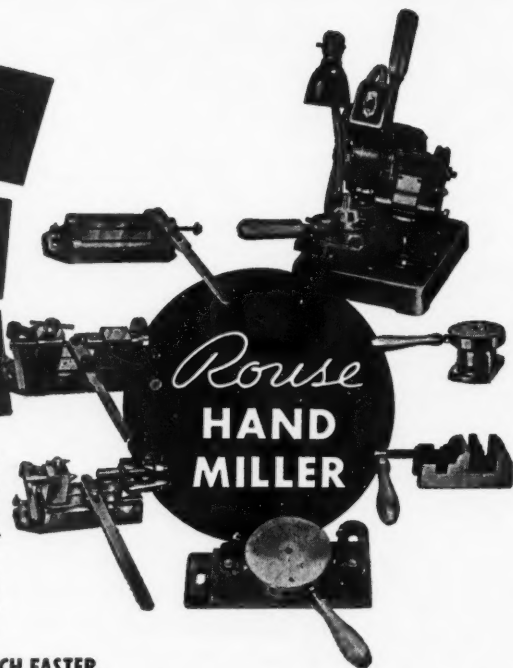
**PAYS FOR ITSELF
QUICKLY...**

The ROUSE HAND MILLER is a widely used, inexpensive, high speed, ball bearing, motor driven machine for handling light cuts in brass, aluminum, steel, plastics, and other materials—fast, accurately, and at very low cost. Only \$106.00*.

Fixtures (illustrated) extra.

Motor equipment:—1/4 H.P., 110 Volt AC 60 cycle, single phase, swivel motor mount and light—\$29.00*.

*All prices FOB Chicago.



- ★ **MILLS SMALL PARTS MUCH FASTER.**
- ★ **DRASTICALLY CUTS YOUR INVESTMENT IN EQUIPMENT.** Replaces expensive production machinery—or releases it for other jobs.
- ★ **INEXPERIENCED HELP CAN OPERATE IT.** Safe, simple, fool-proof operation.
- ★ **NO MORE COSTLY SET-UP TIME.** \$106.00* price so low that it pays to keep one or more Hand Millers always set-up for special operations.
- ★ **YOU GET A BETTER PRODUCT**—the result of ABSOLUTE ACCURACY.
- ★ **A LOSS BECOMES A PROFIT** when marginal pieces are finished on the Hand Miller instead of on high cost equipment.
- ★ **VERY LOW MAINTENANCE.**
- ★ **USED REGULARLY IN 1163 MANUFACTURING PLANTS** (some of which use as many as 30 machines)—yet on the market a scant few years.
- ★ **UNIQUE—VERSATILE.** Nothing else like it. One or several machines can be the answer to some of your production problems.

**Write today
for further
information.**

H. B. ROUSE & COMPANY

2214 N. WAYNE AVE., CHICAGO 14
50 YEARS OF SERVICE TO INDUSTRY

Lighter... faster Rotor grinders

"PAID OFF" in 48 days

JOB: Grinding welds on truck cabs. Using slow, 20-pound electric grinders. Only 2800 r.p.m. under load.

SOLUTION: Rotor Application Engineer suggested changing to Rotor 6" Air Grinders that weigh only 9¾ pounds. Speed 5300 r.p.m. under load.

RESULTS: Stepped up metal removal,

increased wheel life. Lower maintenance. Cut man-hours per cab. Savings "paid off" cost of Rotor Grinders in 48 days—on basis of 50% use factor.

Call in your Rotor Application Engineer for a study of your portable tool operations to suggest improvements. Write for Catalog No. 38.

AIR O'TOOL

ROTOR GRINDER FACTS

LIGHTER... Unique two-blade design and magnesium handles. Easy to move around. 6" Rotor Grinder weighs only 9¾ lbs... 8" only 11¼ lbs.

FASTER... Rotor Grinders, known as the "Power Plus" line are recognized everywhere for their high speed under load.



AIR

THE ROTOR TOOL CO.

CLEVELAND, OHIO

HIGH
CYCLE

UNBIASED ANALYSIS OF PORTABLE TOOL PERFORMANCE

CUT COSTS WITH MULTIPLE BENDING

Whether you're bending pipes, tubes, reinforcing bars or structural shapes, you can greatly increase your bending production by multiple die bending.

Shown here is our Model A-5 BENDING MACHINE, tooled for bending 3 different radii without changing the set-up. In order to make multiple bending cost no more per die than single bending, individual dies are merely stacked on the die spindle and a shoe of the proper width permits the same degree to be bent without changing the automatic reset switch. The MODEL A-5 will bend pipe up to and including 2" standard weight pipe.

Redesigned and greatly improved, the Model A-5 still sells for only \$1975. F.O.B. factory, U.S. Funds.

Smaller and larger machines available.



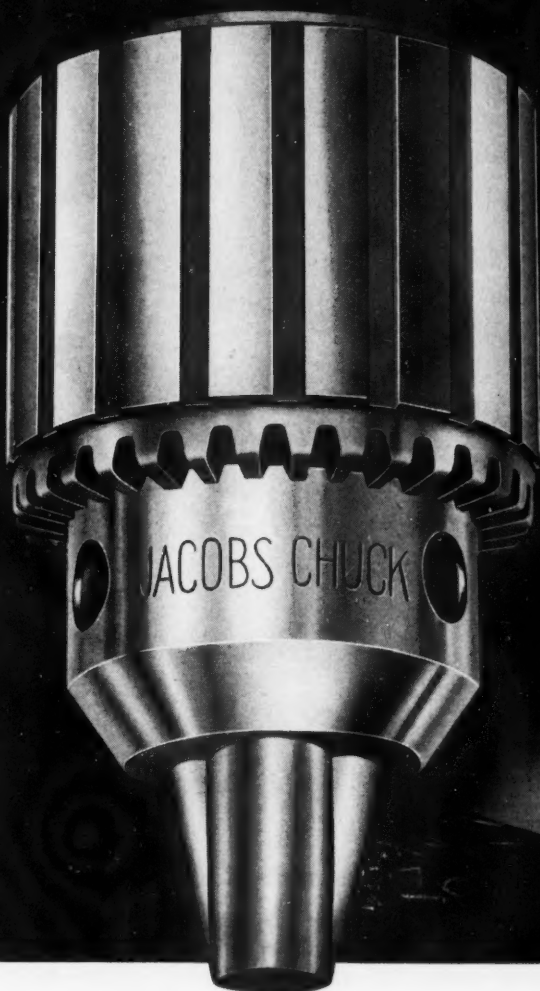
Write for detailed and descriptive folder.

PEDRICK TOOL & MACHINE CO.

3640 N. Lawrence St.

Dept. 5,

Philadelphia 40, Pa., U.S.A.



TIGHTEN YOUR GRIP ON PRODUCTION

Production flows faster and smoother when your machine tools are equipped with Jacobs Chucks.

Rugged construction, great gripping power and accuracy have made The Jacobs Plain Bearing Drill Chuck the choice of machinists throughout the world.

The Jacobs Manufacturing Company, West Hartford 10, Connecticut.

IF IT'S A **JACOBS** IT HOLDS

***Jacobs and your
local distributor***

are ready to deliver the chucks you need and the service you deserve.

... first in chucks

... first in service

BALANCED DESIGN

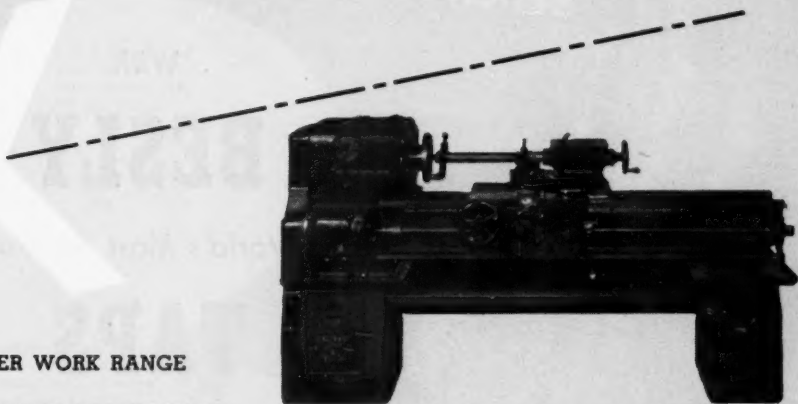


Tray-Top Cintilathes make friends of your customers by helping you deliver top quality work at less cost. Every pound of weight; every gear, shaft, bearing; every working component; every control—does its part to improve your products and lower your costs. If your business is competitive, compare the work you are getting from your present machines with the performance you can expect from Tray-Tops per dollar invested. Your Cintilathe dealer will gladly arrange a demonstration.

best buys in their class!

CINTILATHE

MORE QUALITY FEATURES



WIDER WORK RANGE

MAXIMUM CONVENIENCE

SIMPLE INSTALLATION

EASY MAINTENANCE

SUSTAINED ACCURACY

ECONOMY PRICED

12 spindle speeds in geometric progression with an all geared transmission . . . Large spindle mounted in three precision anti-friction bearings . . . Direct-reading color-match speed shift . . . Double walled, one piece apron with automatic lubrication . . . Totally enclosed, automatically lubricated, quick-change gear box, incorporating leadscrew reverse . . . Flame hardened gears in headstock, quick change box, and apron . . . Ground bedways (flame hardened at extra cost).

CINTILATHES: The complete, balanced line; Tray-Top for light duty (engine, toolroom and gap bed models); 10", 12½", 15", 18" sizes; 18" to 114" center distances. Model LT for medium duty (engine and gap bed models). 16", 18", 20", 24" sizes; 30" to 264" center distances. Write for catalogs and name of your nearest dealer.



best buys in their class!

CINTILATHE

CINCINNATI LATHE & TOOL CO., CINCINNATI 9, OHIO, U. S. A.



Doing the Hole Job —

Better, Faster, at Lower Cost

With

BESLY

The World's Most Accurate

TAPS

• LET US PROVE that Besly can help you get better threaded parts, longer tap life and lower tapping costs.

Ask your authorized Besly Distributor for a TRIAL RUN on your toughest jobs . . . PLUS details on Besly's Super-Service on "Specials".



BESLY-WELLES CORPORATION

Established as Charles H. Besly & Co. in 1875
108 Dearborn Ave. • Beloit, Wisconsin

BESLY Drills, Reamers and End Mills—High-Speed Cutting Tools in a complete range of types and sizes.

UNSURPASSED ACCURACY AT ALL VITAL POINTS



Microcentric CHAMFER



Accurate
RAKE ANGLE



Solid-Ground THREAD FORM



Mirror-finish
FLUTES



Tru-Square DRIVER

TAP TIPS

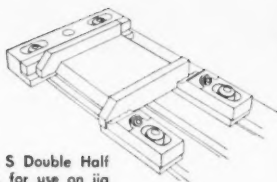
The handy "Handbook for Tap Users" is full of information on tapping methods and tap selection. Write for your Free Copy.



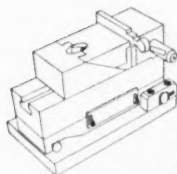
Eliminate U-Clamps, Straps and Fingers

J & S *All-Purpose* JAW CLAMPS

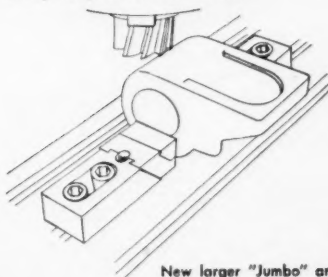
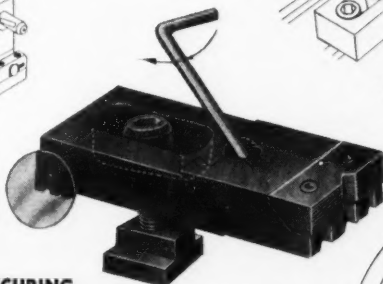
secure work-pieces quickly and rigidly
easily adapted to box fixtures



J & S Double Half Vise, for use on jig borers, millers, planers and shapers.



Precision Grinding Vise with or without sine bar allows rapid unloading and exact relocating.

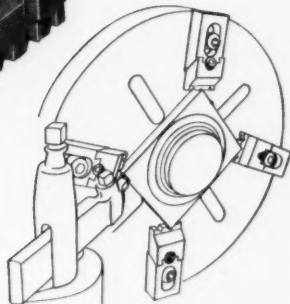


New larger "Jumbo" and "Lil-Giant" clamps for use on larger-type planers.

NEW METHOD OF SECURING WORK-PIECES TO MACHINE TOOLS

for Lathes, Planers, Milling Machines, Boring Millers, Jig Borers, etc. (9 different types including new Counter Clamp)

1. **Faster Set-up:** One adjusting screw provides a 5-ton force to position and hold the work-piece.
2. **Stronger Grip:** The inward and downward movement of the jaw clamp at a 45° angle gives a single, powerful clamping action — easily applied and controlled.
3. **Less Obstruction:** You can pass over the whole clamp 1" from the working surface of the machine face. No interference with reading or measuring tools.



Typical lathe application. Standard clamp in use.

J & S TOOL CO., INC.
645 W. Mt. Pleasant Ave., Livingston, N. J.
(N. J. Highway Route No 10)



New home of J & S Tool Co., Inc.

**J & S
TOOL CO. INC.**

DELIVERY FROM STOCK

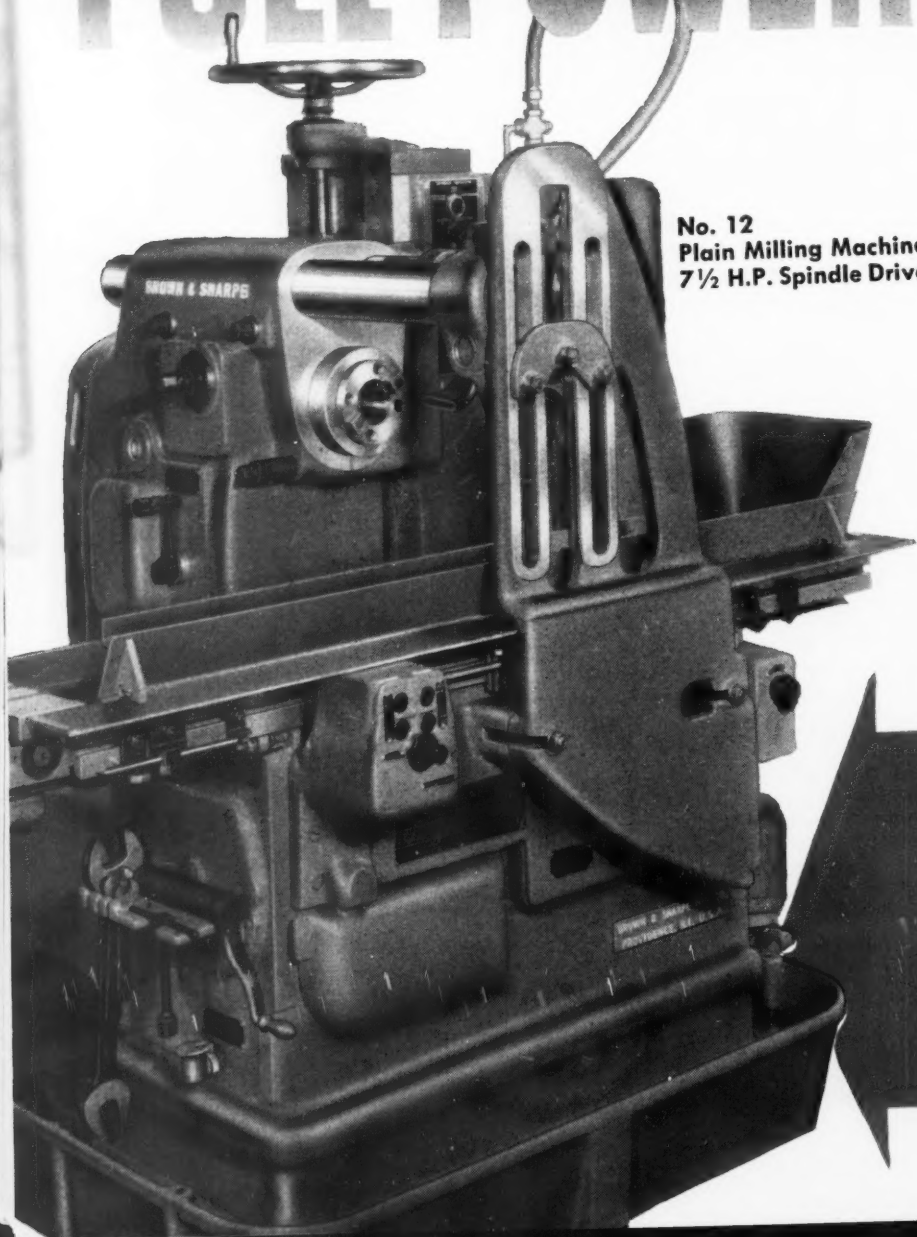
WRITE FOR NEW FOLDER

—contains complete details on advantages, applications, types and sizes available. Booklet describing J & S "Fluidmotion" Wheel Dressers, etc. also sent on request.

J & S

FULL POWER

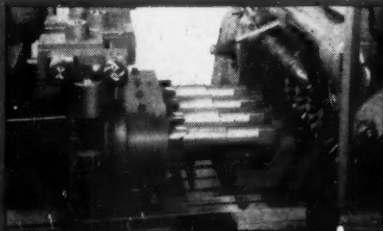
No. 12
Plain Milling Machine
7½ H.P. Spindle Drive



... 7½ h.p. at the spindle for extra fast milling on long and short run jobs

Through extra power and simplified operation, this machine gives you important competitive advantages for meeting today's high production schedules.

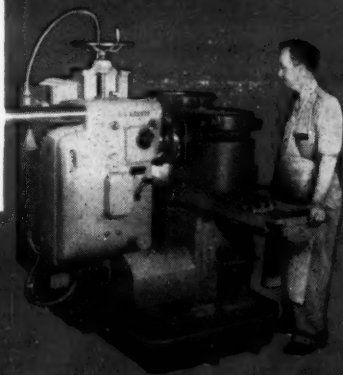
It allows you to take heavy cuts at fast feeds on a wide variety of medium-sized work . . . quick set-ups are assured by many time-saving features. Dual feed rates, a variety of automatic cycles, and the ability to climb mill in either direction are just a few of its advanced conveniences. Write for complete details on the powerful No. 12 Plain Milling Machine — 7½ H. P. Spindle Drive. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.



SPECIAL FIXTURES make the No. 12 a still higher production machine. Brown & Sharpe Engineering Services are available to you for special applications.



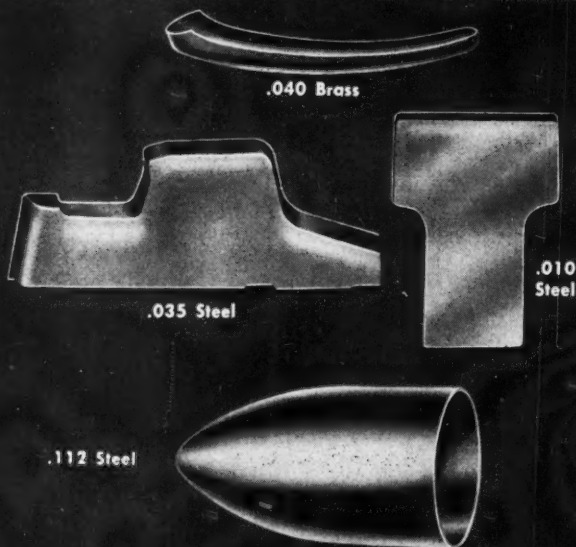
POWERFUL CUT. Steel forging is 5" wide and cutter removes ¼" of stock at a fast feed. Unique high ratio gearing makes faster cutting possible.



HIGH SPEED MILLING. The powerful No. 12—7½ h.p. spindle drive, permits taking full advantage of the faster feeds and speeds possible on many medium-sized carbide milling jobs.

Brown & Sharpe

"One Punch" TRIMS SHELLS COMPLETE



Increase output...reduce costs!

Costly, time-consuming trimming and notching operations can be done in one operation with a Brehm Trimming Die. Don't worry about stock thickness. Edges will be of full thickness—clean, flat, without burrs or distortion at the trimmed edge.

Other Brehm Die advantages! **Workable Materials**—gold, silver, stainless or mild steel, copper, brass, zinc, aluminum, fiber, rubber, plastics, or what did you have in mind? **Quantities vary**—stove or refrigerator doors, auto bumper buffers or type-writer covers, from 264 to 900 per hour. Intermediate parts, where stock and scrap can be blown from the die, about 1200 per hour. **Shapes**—fountain-pen ferrules, artillery cases, watch cases, burial vaults, automotive, kitchen, radio and television

accessories and parts. Almost anything *you* need trimmed.

A Brehm "Shimmy" Trimming Die with angular cams, cuts four ways in one press stroke, handling straight or curved edge contours, with multiple notches and projections. Slow, costly "horn" and "pinch" trimming operations, are eliminated.

Write today . . . for your free copy of the Brehm Die Catalog. If you wish, submit blueprints or parts for full information or quotation.

Brehm®
TRIMMING
DIES

THE
"SHIMMY"
REG.
DIE

◀ **THE STEEL PRODUCTS ENGINEERING CO.** ▶
BREHM DIE DIV., DEPT. 11, SPRINGFIELD, OHIO

For Holding

SMALL →

MEDIUM or →

LARGE PARTS →

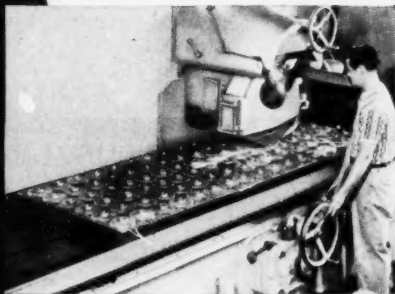
Use Sundstrand Magnetic Chucks

Here's another interesting application of magnetic holding applied to a surface grinder. The deep penetrating power of the Sundstrand magnetic chucks makes it possible to hold a great number of small parts or large castings. In all cases setup is simplified and clamping time is greatly reduced.

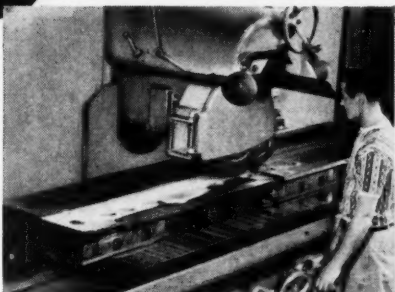
Whether you have tool room, production, or special holding problems, look into the possibilities of eliminating expensive clamping and increasing production with Sundstrand Magnetic Chucks.

Get All the Facts

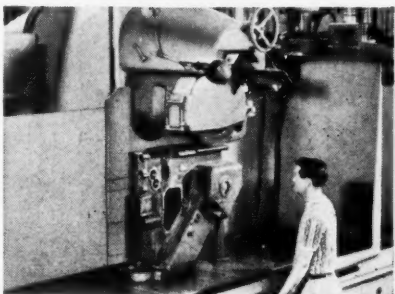
Write for complete information on these time saving magnetic chucks. Ask for bulletin 530-M.



Grinding a load of 102 gears.



Grinding four slide castings.



Grinding drill press frame

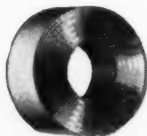
SUNDSTRAND

Magnetic Products Co.

Division of Sundstrand Machine Tool Co.
1020-9th ST. • ROCKFORD, ILLINOIS

The low cost way

from coil stock ...



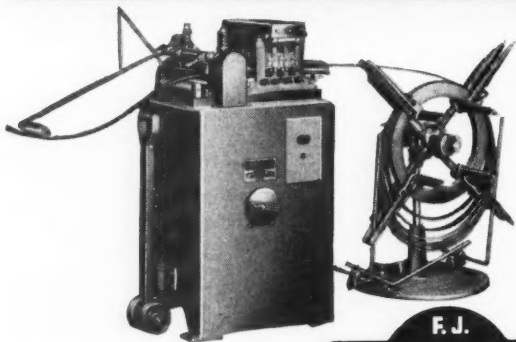
to flat stock ...



for flat blanks ...



is through LITTELL straightening machines ...



Thirteen medium and heavy duty models of Littell Straightening Machines straighten coil stock of all standard widths and thickness. No. 308 series straightens stock from a fraction of an inch to 8" wide, and from .018 to .065" thickness. No. 4 series straightens stock from a fraction of an inch up to 12" wide, and from .065 to .125" thick. Variable speed transmissions are adjustable to the requirements of presses, shears or slitters.

WRITE FOR CATALOG

**F. J.
LITTELL
MACHINE
CO.**
Speed
with Safety

**ROLL FEEDS • DIAL FEEDS
STRAIGHTENING MACHINES
REELS • AIR BLAST VALVES**

District Offices: Detroit, Cleveland

4163 N. RAVENSWOOD AVE., CHICAGO 13, ILL.

a critical **ORDNANCE** job solved with . . .



BY MOORE SPECIAL TOOL CO.

die set
BY **PRODUCTO**

Millions of small ordnance fuse component springs stamped exactly right. Tolerance between punches and dies is maintained thru 18 stations at .0005" . . . only the top quality of Producto Die Sets makes such accuracy possible.

OPERATIONS: Piercing, forming, blanking.

SIZE OF PIECE: $1\frac{1}{4}$ " long, $\frac{1}{8}$ " wide.

MATERIAL: .012 spring steel.

PIECES PER GRIND: 100,000.

PRODUCTION: 9,600 pieces per hour.

For definite dollar savings, maintained accuracy and highest production, specify "PRODUCTO" . . . approved by the country's leading manufacturers.

Call Producto in your classified telephone directory. Representatives in 36 main stamping centers.

the **PRODUCTO MACHINE COMPANY**

910 HOUSATONIC AVENUE • BRIDGEPORT 1, CONNECTICUT

2PD52B

April, 1953

MODERN MACHINE SHOP 57

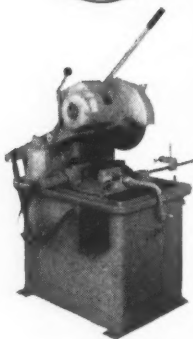
You Can CUT COSTS in Cutting

**SHEET
PLATE
STRUCTURALS
ROD-BAR
TUBING
EXTRUSIONS**

with **STONE** HIGH-SPEED CUTTING MACHINERY

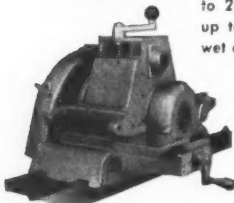
LOOK AT THESE TYPICAL CUTTING TIMES

Cold Rolled	1" Dia. Rod	4 Seconds
Pipe	2" ID-3/16" Wall	5 Seconds
Angle Iron	2"x2"x3/8"	7 Seconds
Aluminum	2" Dia. Rod	10 Seconds
Brass	1"x1" Bar	4 Seconds



MODEL M-75

A floor model, 2½' x 4' equipped with full 7½ h.p. geared-in-head motor engineered with positive drive, will cut all ferrous and non-ferrous solids up to 2½" — pipe and structurals up to 4". Can be equipped for wet cutting.



MODEL SS-20

Operates on guided rails for cutting larger structural steel, plate, sheet, with cuts up to nine feet in length. Cuts wet or dry.

MODEL M-14

32" x 34" Bench Model. This mighty little brute, with full 3½ h.p. geared-in-head motor engineered with positive drive, will cut all ferrous and non-ferrous solids up to 2" — pipe and structurals up to 2½". Two models — straight cut-off and swivel head for angle cutting to 45°. Legs available.



For complete information write to

STONE MACHINERY Co., Inc.

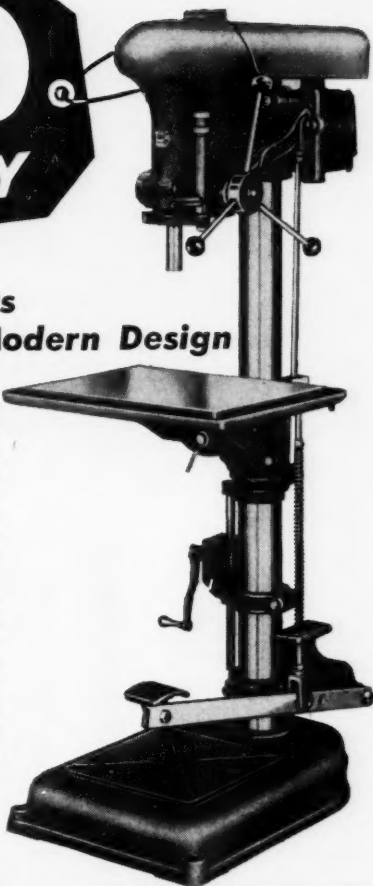
410 Fayette St., Manlius, N. Y.

**SOLD
TO: INDUSTRY**

New 18" Drill Press Offers Ruggedness, Accuracy, Modern Design

MORE and more industrial users are turning to this new Duro 18" press as the solution to their drilling problems. Massive, heavy, with a large capacity, it is ruggedly built to withstand the wear and abuse of rigorous production drilling. This Duro giant is a "performer"—high speed production drilling operation or intermittent drilling requiring accuracy and precision are handled with equal ease and dependability.

Here are just a few of the many remarkable advantages "built-in" to assure finer quality, greater reliability, and longer "maintenance free" operation; precision ground alloy steel spindle; 4 ball bearings sealed and permanently lubricated; precision bored bearing seats assure perfect alignment; massive close grained head casting eliminates vibration; sturdy cast hinged belt and pulley guard; easily adjustable feed tension with pin for positive positioning; table raising mechanism; with or without foot feed.



Model C3088-18" Drill Press
(Illustrated) Less Motor and Switch . .

\$239.50

WRITE FOR DETAILS!

Write today for illustrated catalog information giving full details and specifications on this Duro 18" and other Drill Presses . . also brochure on the complete line of Duro precision engineered power tools.



DURO METAL PRODUCTS CO.
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Please send me full details on your 18" and other Drill Presses in your line . . plus Brochure showing complete line of power tools.

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Address

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DURO METAL PRODUCTS CO.

2676 N. KILDARE AVE. - CHICAGO 39, ILL.

Also Makers of Duro Chrome Hand Tools



Send for Bulletin P552.
Get specifications on
Press - Rite's complete
line from 5 to 85 tons.

INCREASE PRODUCTION — CUT COSTS . . .

Use the 30 ton Press-Rite equipped with the time-saving Airflex Clutch. Costly down time for adjustments eliminated because the Airflex Clutch is self adjusting. A full power stroke delivered through every operating cycle. Air pressure regulated to suit your work. Air and safety-spring brake give added operator safety. Press-Rite presses with the Airflex Clutch plus other outstanding Press-Rite features team up to give you fast, economical production.

Sales Service Machine Tool Co.

PRESS RITE PRESSES • SHAPE RITE SHAPERS • KELLER POWER HACK SAWS

2355 UNIVERSITY AVENUE • ST. PAUL 4, MINNESOTA



NEW DRILL STOP

by  SCULLY JONES

End Guesswork and Reduce Rejects:

You often require close control of depth for operations—as in center drilling, drilling and reaming—on turret lathes, radial drills and other machines. On these operations, or wherever a quick change arrangement is used in one station for sequence operations, you hold uniform hole depth by using the new S-J Drill Stops. They provide a positive stop which ends guesswork and reduces rejects.



Quick and Easy to Insert, Remove and Adjust Tools:

Simply loosen set screw and slip stop collar from threaded shank for quick insertion or removal of taper shank tools. The threaded lock bushing provides quick and accurate adjustment of the stop collar. Only a quarter turn of the set screw forces the bushing against the shank threads for a positive lock.

Write for
BULLETIN NO. 18-50
for data
on Drill Stops.

Work on Close Centers:

The small body diameter permits you to operate these Drill Stops on close centers and near shoulders or other obstructions.

Trouble-Free Performance:

S-J Drill Stops are made from an alloy steel with all points of wear hardened for long life. The four chip grooves tend to break up and remove any chips from the surface on which it stops. Investigate the use of S-J Drill Stops wherever you require a positive control for depth of hole. Made in 8 sizes having Morse Taper shanks and holes.



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YOU GET LOW COST FAST ACCURATE PRODUCTION WITH OUR STANDARD AND SPECIAL TOOLS

Do You Want

STEEL PLATE SHAPES

WITHOUT COST
OF MACHINES?

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WITHOUT
ADDITIONAL
MANPOWER?

*By-Products works directly from blueprints . . .
no patterns needed*

Save time, money and manpower on any job calling for steel plate components. For assurance of accuracy . . . for protection of your production schedules . . . turn your shearing, punching, pressing and other shaping needs over to *By-Products*.

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Plate that's shaped to save you money

BY-PRODUCTS STEEL CO.

A DIVISION OF LUKENS STEEL COMPANY

LUKENS





In Bell Telephone Labs.—Machinists use Magni-Focuser as an aid to accuracy.



In General Electric Plant—Magni-Focuser helps workers make accurate adjustments on precision equipment.

All the photographs on this page show Magni-Focuser in actual use in the plants named



At Superior Tube Co.—Inspectors use Magni-Focuser to ensure flawless Hypodermic Needle tubing.

People work better when they **SEE BETTER**

PRECISION workers do the job faster and more accurately with a Magni-Focuser—the binocular magnifier.

Shows objects clearly magnified, and in third dimension. Reduces eye-strain and *prevents squinting*—thereby saving time, increasing accuracy and minimizing the chance of errors and accidents.

Widely used in precision assemblies, gauge reading, layout work, blue-print inspection, tool and die work. Restores the usefulness of the skilled hands of many older workers whose vision needs a seeing aid. May be used with or without eye glasses. Leaves both hands free to work. Normal vision resumed by slightly raising head. Order for 10-day trial. \$10.50. Return if not satisfied. Send for descriptive folder.

Leaves both hands free to work

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MAGNI-FOCUSER Binocular Magnifier



At SKF Industries, Inc.—Magni-Focuser helps in converting wire into "points" for ball-point pens.



At Allen B. Du Mont Laboratories Inc.—Using Magni-Focuser to inspect glass neck assembly of television picture tube.

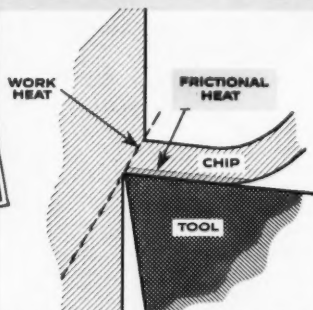
NEW! A coolant that reduces frictional heat!



Water-type WAX coolant

Developed and thoroughly tested by the makers of Johnson's Wax, *Johnson's Wax-Cool* is the first water-soluble coolant to introduce *real lubrication* between tool and chip, thereby attacking frictional heat at its source.

Because of wax's polar attraction for metals, Wax-Cool *stays with* tools and works even under high heat and pressure, preventing chip weld and reducing frictional heat far more effectively than water-soluble coolants. Wax-Cool's ability to reduce frictional heat means: Far greater tool life... improved finish... increased production.



Because of wax's greater lubricity, Wax-Cool effectively attacks frictional heat which develops at the tool-chip interface. Wax-Cool also disperses shearing zone work heat.

WAX-CUT—new wax-type cutting oil Johnson's Wax-Cut brings all the lubricating and heat-dispersing benefits of special waxes to automatic screw machines and gear cutting machines.

A TEST IS YOUR BEST PROOF! Hundreds of production shops across the country are already benefiting from the improved lubricating qualities of these specially blended waxes.

A test of Johnson's Wax-Cool or Wax-Cut in your own machines will show you new standards of performance and economy.

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A product of Johnson's Wax Research



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TOUGH ALLOY
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ELECTRIC WELDED
HIGH SPEED
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SEND FOR LENOX HOLE SAW
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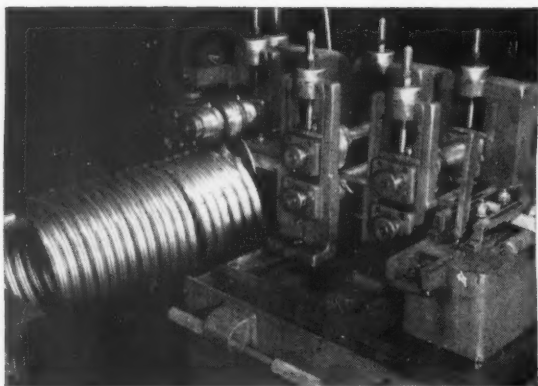
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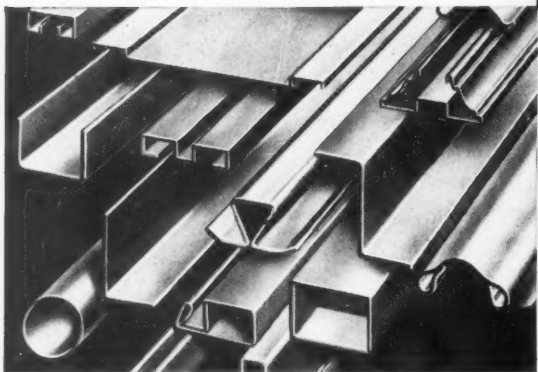
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CURVING and coiling to almost any diameter, are two out of many operations which can be performed in a Yoder roll forming machine. As fast as formed, the sections can be continuously coiled and cut to length to make rings for auto hub caps, headlights, wheel trim, stator rings, etc., at a huge saving in cost of materials and labor.

Among other operations which can be tied in with cold roll forming may be

IN A **COLD ROLL FORMING MACHINE**

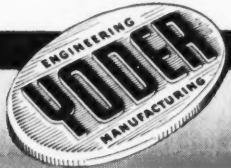
mentioned embossing, notching, perforating, welding, flattening, lock-seaming, filling and closing tubular shapes, wrapping, edge trimming, etc.

In the design and assembly of production lines of this character, the know-how of the Yoder engineering staff is at your service. The Yoder book on Cold Roll Forming deals broadly with the most important phases of the subject. Ask for it.

THE YODER COMPANY
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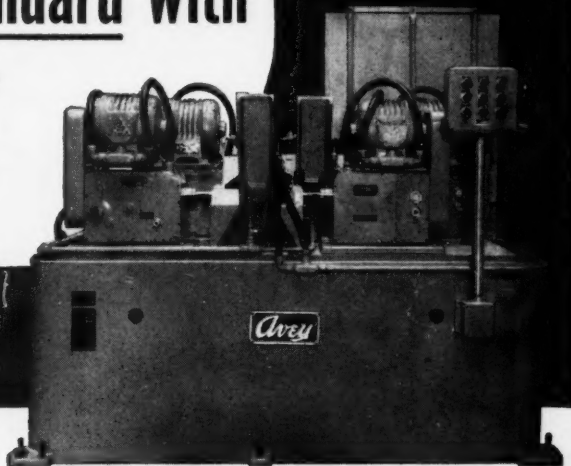
Complete Production Lines

- ★ COLD-ROLL-FORMING and auxiliary machinery
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Special Jobs are Standard with AVEY

*Produces
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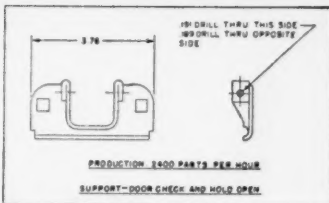
SPECIAL MAGAZINE FEED DRILLING MACHINE

S. O. No. 17893—Consists of two pairs of No. 1 Avey Cam Feed Units mounted horizontally and opposed on a well designed fabricated steel base. Each pair of Units can be operated individually or collectively and each pair of Units is arranged with loading chute for magazine feed.

The parts are gravity fed down the chute to the drilling position.

Fixture—At the drilling position they are clamped automatically by an air cylinder which clamps the part on the forward stroke. The cylinder is arranged with a small ejector finger which automatically ejects part which passes into a chute in rear of machine. All clamping pressure is transmitted to the ears with final location in the square holes.

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There's an AVEY to fit your particular job.

Consult the yellow pages in your phone book
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either tool room or high production

* BIG ACCURATE LEAD SCREW

INDEPENDENT FEED SHAFT

BIG PRECISION TIMKEN BEARING SPINDLE

HEAVY TAIL STOCK, ANTI-FRICTION THRUST BEARINGS

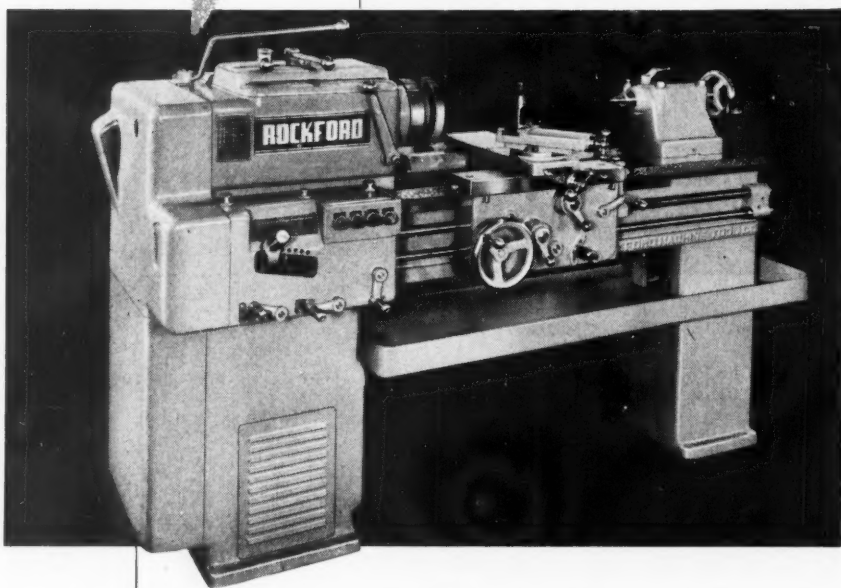
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TOOL ROOM ACCURACY, ZERO PRECISION BEARINGS,
PRODUCTION POWER, 5 H.P. DRIVE MOTOR

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HEAVY CUTS, 16" OR 18" SWING, 30" CENTER DISTANCE

6' BED, DOUBLE-WALL APRON, 3100 LBS. TOTAL WEIGHT



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Rockford Lathes offer you all of these production features, with modern design, ample dimensions and high quality materials.

Ask a Rockford Machine Tool Co. Representative to give you full details on the practical production advantages of these heavy service, medium sized, economy priced machines.

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ROCKFORD MACHINE TOOL CO.
2500 KISHWAUKEE STREET • ROCKFORD, ILLINOIS

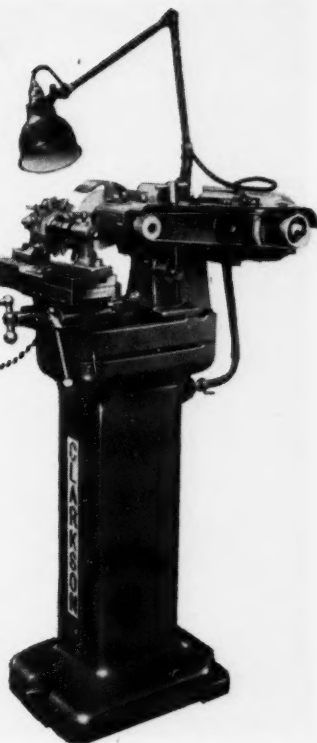
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**THE CLARKSON
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Simplicity . . . Speed . . . Economy are featured in the Clarkson Cutter Grinder . . . designed specifically for use in the manufacture of Clarkson Milling Cutters. All of the desirable features recognized as essential through years of experience, to the manufacture of cutting tools are incorporated into the Clarkson Cutter Grinder, yet it is low in cost, *right* for use in *your* plant for resharpening

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Gentlemen:

Please send full information and prices on the
Clarkson Cutter Grinder.

NAME.....

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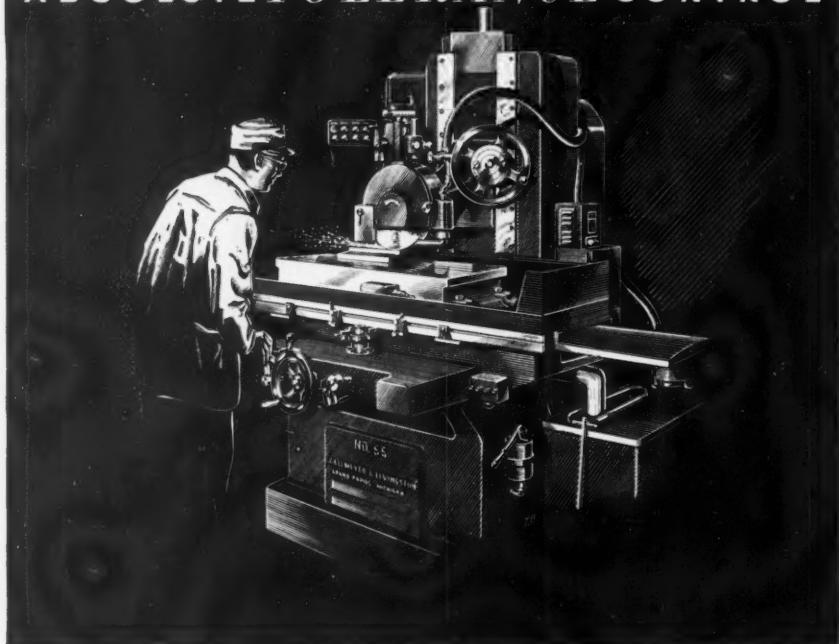
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DEDLOCK CHUCKS • AUTOLOCK CHUCKS • MILLING CUTTERS • CLARKSON CUTTER GRINDERS

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When job specifications leave no leeway, when extreme tolerances must be rigidly maintained . . . that's when the built-in precision of Grand Rapids Grinders proves most valuable.

Defense commitments make it impossible for us to fill your orders as rapidly as we'd like to...but we know our customers can appreciate the reasons for delay. As always, we're doing our best to serve you.

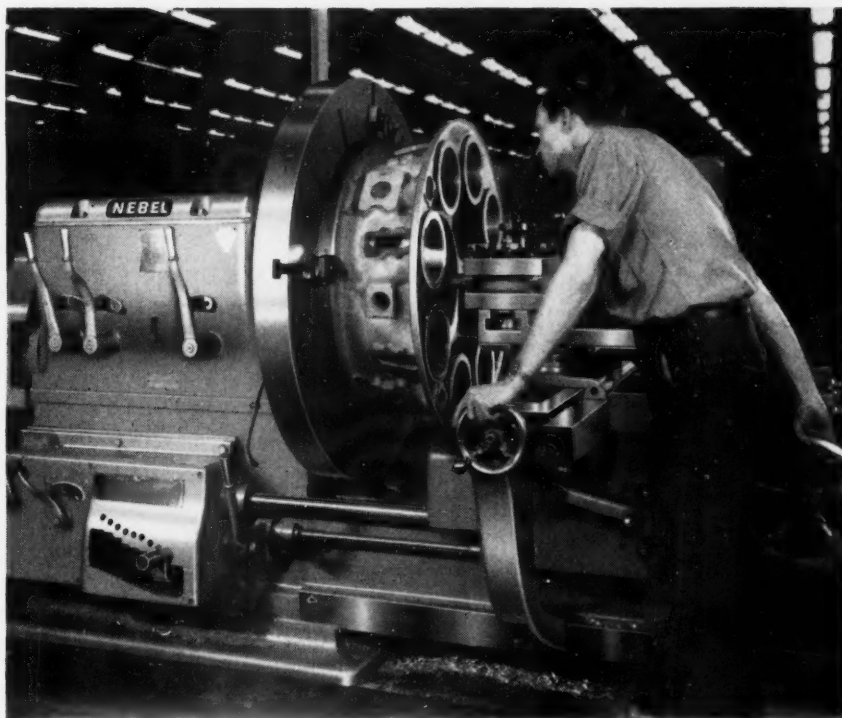
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GRAND RAPIDS GRINDERS

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Speed and Accuracy count at G.E.'s jet engine plant

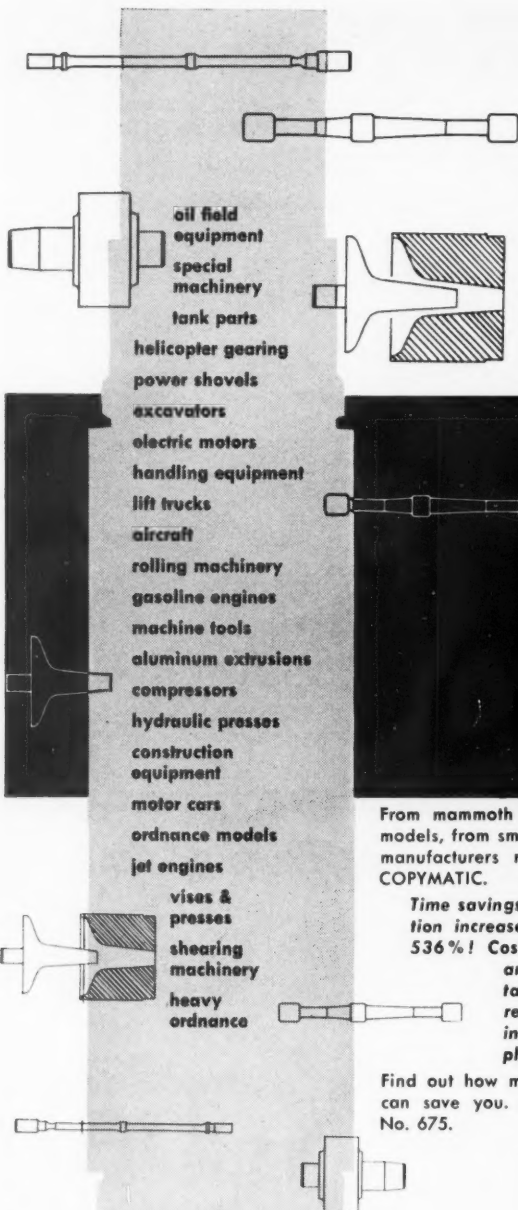
TOUGH JOBS ARE EASY WORK for Nebel extension bed gap lathes . . . with their flexible swing and center distance capacity. The Nebel "G" series shown above—machining a hard-to-handle compressor rear frame—is one of several on the job at General Electric's jet engine plant in Cincinnati.

MORE LATHE...LESS MONEY. Nebel lathes give you the speed, power, stamina and accuracy you need at minimum cost. They're ideal for production and maintenance requirements. Available in heavy duty engine, removable block gap and extension bed gap models . . . in swing sizes from 16" to 50".

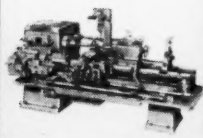
Write today for descriptive literature. The Nebel Machine Tool Co., Cincinnati 25, Ohio, U.S.A. Members of the National Machine Tool Builders' Association.

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**SAVE time ... cost,
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From mammoth construction equipment to ordnance models, from small gasoline motors to jet engines . . . manufacturers report significant savings using the COPYMATIC.

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Find out how much a Lodge & Shipley COPYMATIC can save you. Ask for case histories and Bulletin No. 675.

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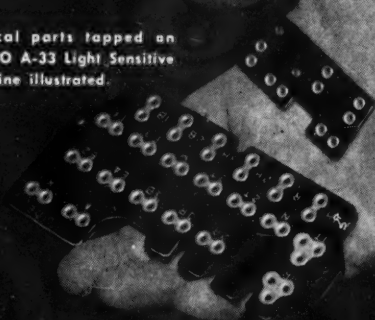
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MODEL A-33

Small Adjustable Multi-Spindle Driller & Tapper

Typical parts tapped on
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Machine illustrated.



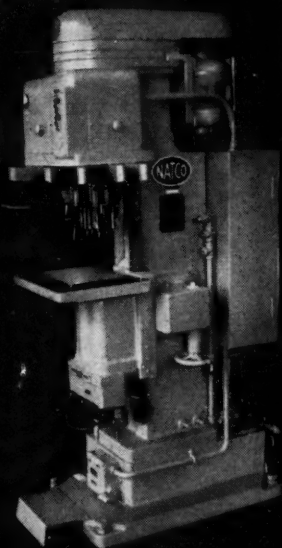
produces

2,200

parts per hour

22,000

10x32 tapped holes



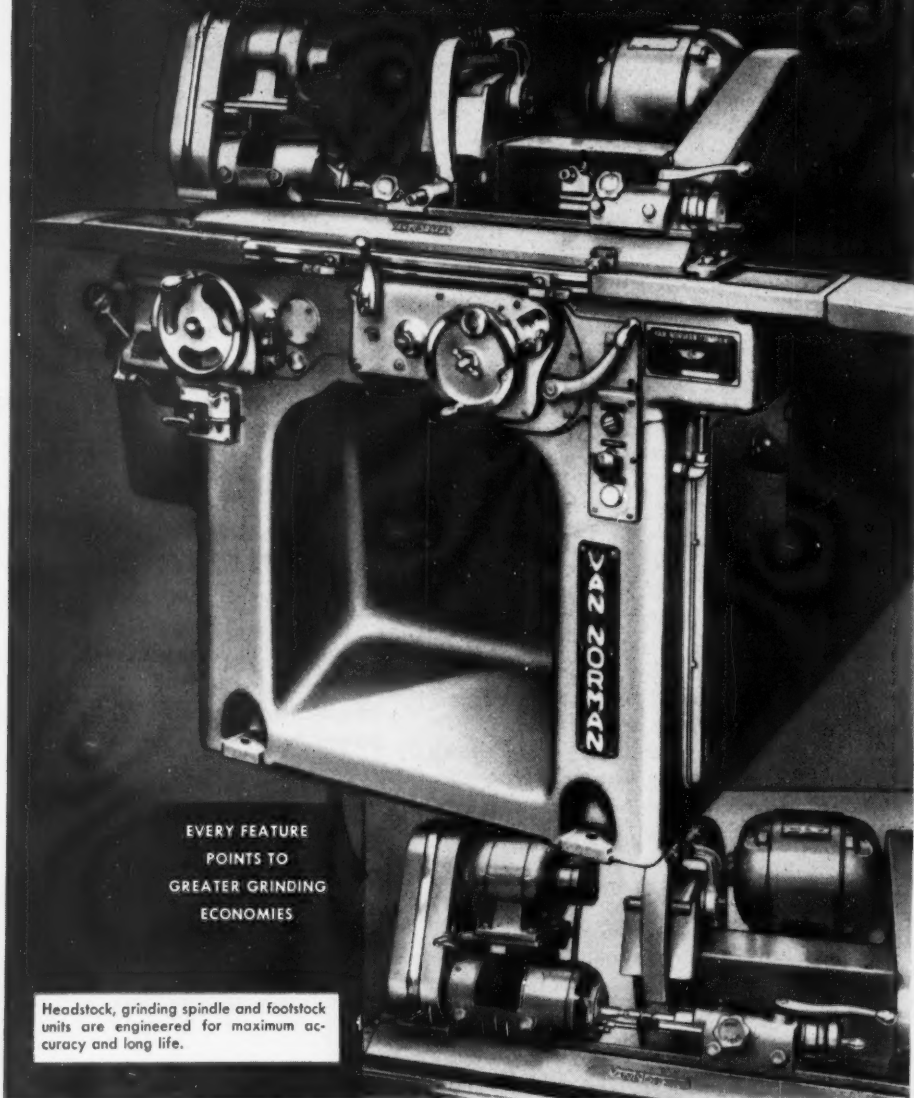
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Call a Natco Field Engineer
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New VAN NORMAN



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Headstock, grinding spindle and footstock units are engineered for maximum accuracy and long life.

418 Cylindrical Grinder

**Engineered to
Save Time...Reduce Costs
Of Short-Run or
Production Grinding of Small Parts!**

Here's the new Van Norman Cylindrical Grinder that is making history in fast precision traverse or plunge grinding of small parts. Quick to set-up, easy to operate, this grinder cuts grinding costs in toolrooms, job shops or machine shops.

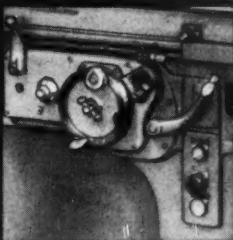
The 418 Grinder is especially designed for ease of operation. Recessed base design permits operator to sit or stand comfortably at the machine. Heavy-duty quality construction throughout assures smooth accurate finish.

COMPARE THESE ADDITIONAL ADVANTAGES

- Pope wheel spindle equipped with heavy-duty SKF double row cylindrical roller bearings.
- Single lever control for rapid traverse and plunge grinding
- Rugged base, wide table bearing ways, separate motor drives for wheel spindle, table and headstock
- Minimum floor space needed, only 43½" x 79¼"

Find out how you can increase production output of grinding small parts. Ask about the price, too...it's exceptionally low for such a high quality machine. Write:

VAN NORMAN COMPANY
SPRINGFIELD 7, MASSACHUSETTS, U. S. A.



**CONVENIENTLY GROUPED
WHEEL FEED CONTROLS**
easily reached by operator.

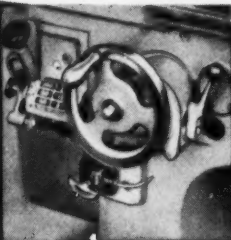
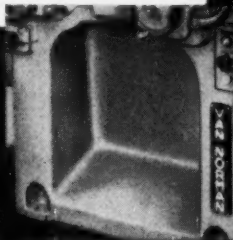


TABLE FEED CONTROLS
all convenient to operator.



RECESSED BASE
design provides operator comfort.

POWER TRANSMISSION FOR EVERY PURPOSE



CULLMAN

CHAIN and SPROCKETS

Stock and Special

ROLLER CHAIN • CONVEYOR CHAIN
SPROCKETS • FLEXIBLE COUPLING

Throughout a constantly expanding field of industrial uses—at high or low speeds, under light or heavy loads—Cullman power transmission components function dependably at full-rated efficiency.

Whether your plant is large or small, and your requirements may run into thousands or a single unit, the stress of today's unusual economy demands an economical, trouble-free power transmission program.

For more than a half-century Cullman has cooperated with manufacturers, everywhere, in the development of low operating costs as a sound solution to their power transmission problems.



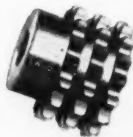
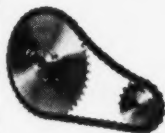
See your local Cullman distributor.

Valuable Information on Power Transmission

in the 72-page Cullman Catalog
51. Statistical tables, charts and
photos can speed your ordering.

CULLMAN WHEEL COMPANY

1352V ALTOGELD STREET • CHICAGO 14, ILLINOIS



CULLMAN

power transmission

ROLLER CHAIN and SPROCKETS

This roll looked perfect...

until SUPERFINISH revealed these defects!

Everybody said it was as perfect a finish as you'd ever see. A 12" steel roll ground down to a smoothness of less than 2 micro inches—dazzlingly reflective from end to end. Not a visible defect—on the surface.

But when SUPERFINISHING began, some interesting marks appeared—longitudinal flat spots—defects produced by the prior operation and then covered up by the heat of grinding.

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If you have fine finish requirements it will pay you to write for the booklet "Wear and Surface Finish."

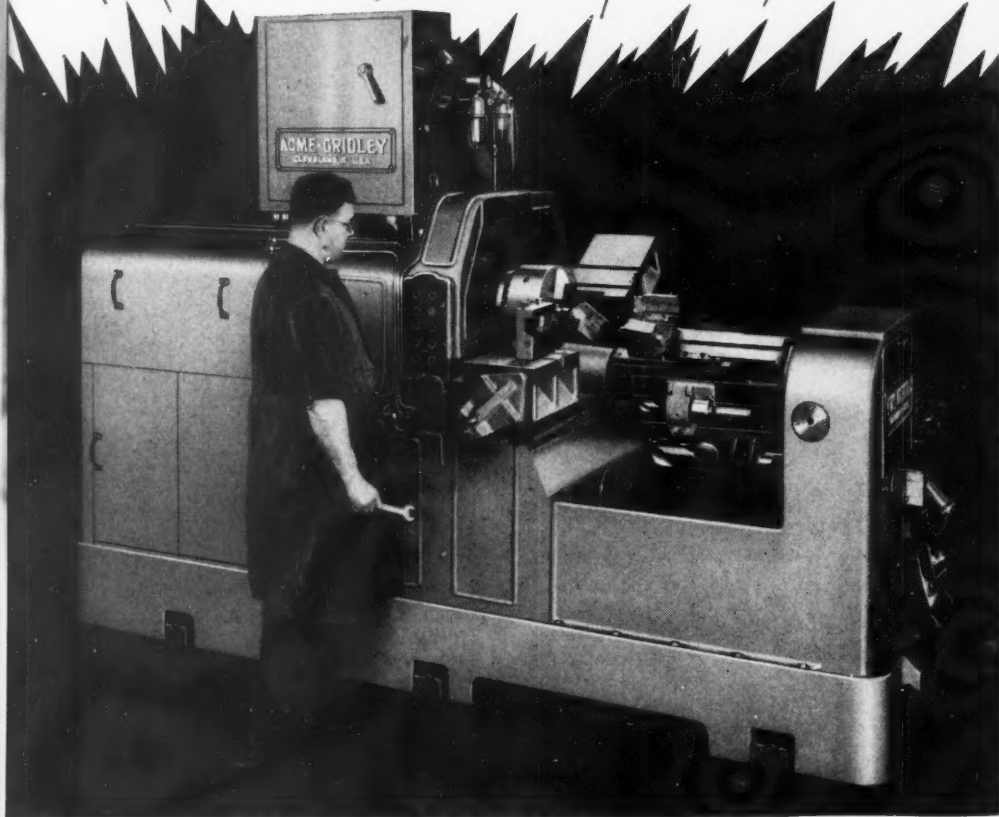


THE GISHOLT ROUND TABLE
represents the collective
experience of specialists in the
machining, surface finishing and
balancing of round and partly
round parts. Your problems
are welcomed here.

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

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Designed especially to meet present day needs... for unprecedented man-hours savings... *strong enough* to use carbide tools with high precision... *fast enough* to supplant obsolete chucking methods up to 5 to 1... *versatile enough* to demonstrate "UNIVERSAL" chucking application.

Remember—

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Announcing the "MC-UNIVERSAL"

the Entirely New 12-inch ACME-GRIDLEY SINGLE-SPINDLE AUTOMATIC CHUCKING MACHINE



WORK CYCLE AUTOMATICALLY CONTROLLED—no time loss between loading and unloading work piece.



SIX PREDETERMINED SELECTIVE SPINDLE SPEEDS, with each combination of change gears, insure correct surface speed for each operation. Wide range of spindle speeds—25 to 1478 RPM.

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Accurate—doubly reinforced frame foundation, precision-cut flame hardened steel cams—sustain close tolerances at fastest feeds and highest speeds modern carbide cutting tools can take.

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170 EAST 131ST ST., CLEVELAND 8, OHIO

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Send me your Bulletin on the NEW Model "MC-UNIVERSAL" Single-Spindle Chucking Automatic as soon as it is off the press.

NAME..... TITLE.....

COMPANY.....

STREET ADDRESS.....

CITY..... ZONE..... STATE.....

The NATIONAL ACME COMPANY

170 EAST 131st STREET • CLEVELAND 8, OHIO

Acme Gridley Bar and Chucking Automatics, 1-2-6 and 8 Spindle
Hydraulic Thread Rolling Machines—Automatic Threading Dies
and Taps—Limit, Motor Starter and Control Station Switches—
Solenoids—Control Manufacturing

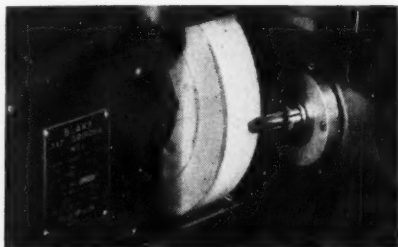
A Proven Method of Reducing Your Tap Breakage

Excessive tap breakage means excessive production costs. That's why so many manufacturers use the precision tap sharpening method to keep tap breakage at an absolute minimum.

What is the precision tap sharpening method? Briefly, it consists of grinding each tap precisely to produce uniform spacing of its cutting edges, accurate and equal hook angles on each cutting edge, and concentric chamfers.

THE IMPORTANCE OF PRECISION SHARPENING

Taps with uneven cutting edges are especially vulnerable to breakage. Uneven cutting edges mean errors in indexing. One land of the tap is ahead of the other, thus placing a greater share of the load on that land and causing it to cut deeper and oversize. Precision sharpening corrects these errors. A tap cutting evenly on all lands is much stronger, much less apt to break, and it cuts closer to size.



CLOSE-UP OF PRECISION TAP SHARPENING

Photograph shows one method of holding small tap on Blake Tap Chamfer Grinder to reduce vibration at point being ground.

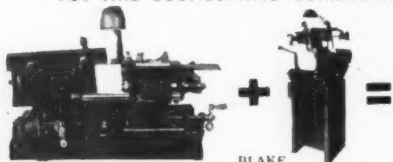
BLAKE TAP SHARPENING EQUIPMENT

The Blake Flute Grinder and Blake Tap Chamfer Grinder are the two machines which enable you to grind taps to the high degree of accuracy necessary to keep tap breakage down to a minimum.

For more information, write us for MACHINERY article, "Why Taps Should Be Sharpened Precisely" and descriptive Bulletins on both Blake machines.

IT'S A FACT! YOU CAN REDUCE YOUR TAP COSTS 50 to 75% by installing Blake tap sharpening equipment and sharpening your taps as you do other metal cutting tools.

PUT THIS COST-CUTTING COMBINATION TO WORK FOR YOU NOW!



BLAKE CHAMFER GRINDER (Described in Bulletin 552) + BLAKE FLUTE GRINDER (Described in Bulletin 631) =

**ACCURATE, TRUE-CUTTING TAPS
LESS TAP BREAKAGE
600% MORE PRODUCTION PER TAP
UP TO 75% REDUCTION IN TAP COSTS**

Write for details about both machines!

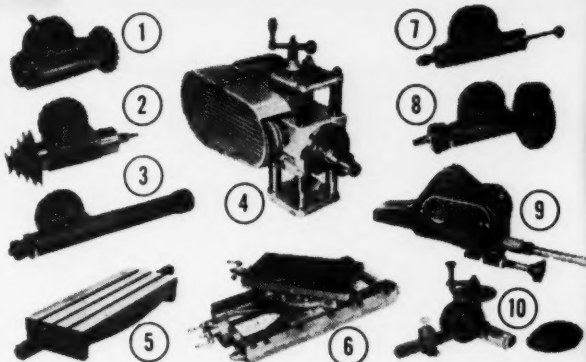
EDWARD BLAKE COMPANY 438 CHERRY ST., WEST NEWTON 65 MASSACHUSETTS

BLACK DIAMOND PRECISION DRILL GRINDERS...
WALTHAM CUTTER SHARPENERS...SURFACE FINISH STANDARDS

master MACHINE TOOL ATTACHMENTS

for
**LATHES
TURRETS
MILLS**

OR USE INDEPENDENTLY



1. 90° Universal Milling Head
2. Hi-Speed Milling and Drilling Head
3. Deep-Hole Internal Grinder Head
4. Basic Milling Unit
5. Milling and Grinding Table

6. Universal Feed Table
7. Internal Grinder Head
8. External Grinder Head
9. Slotting and Keyseating Head
10. Geared Dividing Head

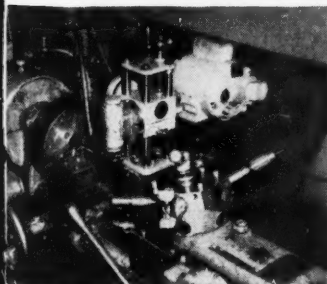
THREE SIZES

MODEL "C," 1/2 hp — 9" TO 13" LATHES
MODEL "B," 1/2 OR 3/4 hp — 13" TO 18" LATHES
MODEL "M," 1 OR 1 1/2 hp — 18" TO 72" LATHES

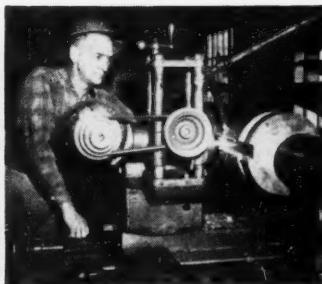
The Master attachment can be used profitably on many production operations. Mount it on your present equipment, lathes, turrets, mills, or use independently to perform additional operations in the same set-up. The basic milling unit with the above types of precision heads gives you facilities for milling, grinding, boring, drilling, indexing, slotting, and keyseating, internal and external. Its full complement of equipment is an outstanding value for maintenance, repair, tool room, and

experimental shops, as well as production, thus performs a full range of shop operations at a minimum investment. These improved models are outstanding in rigidity, capacity, and simplicity of set-up and operation and incorporate the latest features developed in our 17 years of manufacturing this tool. Investigate this valuable shop tool. For the cost of one single-purpose machine, you can have several Master units producing. Prompt deliveries.

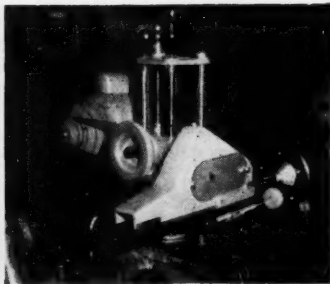
MAKES LOW-COST INDEPENDENT PRODUCTION SET-UPS — PORTABLE — SELF-POWERED



Milling on turret lathe completing part in one set-up



End Milling 2 1/2" keyway in 9 7/8" diameter shaft 22 ft. long



Master Slotting Head on lathe cutting internal taper keyway

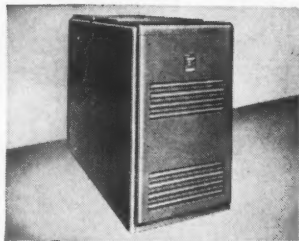


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MASTER MANUFACTURING CO.

1310 EAST AVENUE A • HUTCHINSON, KANSAS, U.S.A.

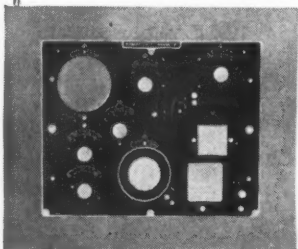


HOME HEATING UNITS
Timken Silent Automatic Div.
Jackson, Mich.

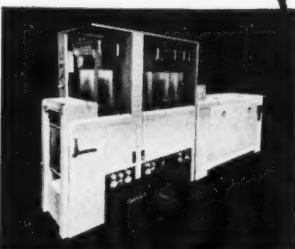
these companies
precision-punch
parts in
small lots
with
low cost
tooling
on



**FOOD PREPARATION and
SERVING EQUIPMENT**
Southern Equipment
Company, St. Louis, Mo.

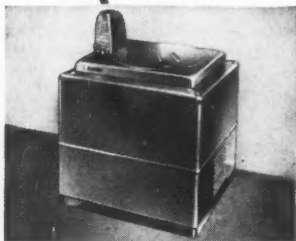


METAL SPECIALTIES
L. F. Grammes & Sons, Inc.
Allentown, Pa.



**PHOTO PROCESSING
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Pako Corporation
Minneapolis, Minn.

WIEDEMANN TURRET PUNCH PRESSES



VENDING MACHINES
The Vendo Company
Kansas City, Mo.

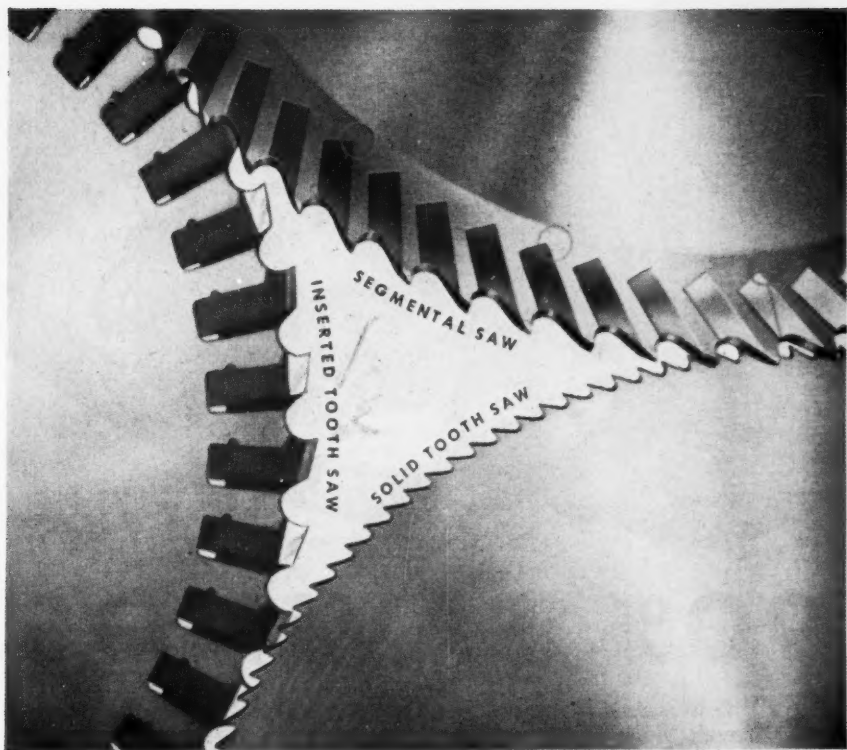


**COMMERCIAL
REFRIGERATORS**
C. V. Hill & Company, Inc.
Trenton, N. J.

you can do the same • ASK FOR A TIME STUDY

WIEDEMANN MACHINE COMPANY

4219 Wissahickon Avenue, Philadelphia 32, Pa.



"Pick your Teeth!"

**For the best saw-performance on your job...
SIMONDS gives you a choice of All 3 Types!**

INSERTED TOOTH: For heavy production cutting of all steel, brass, copper, and aluminum. Alternating square and beveled teeth "tri-vide" chips for easy cutting and clearance. Teeth can be easily replaced, singly or in complete sets, in your own plant by any average mechanic.

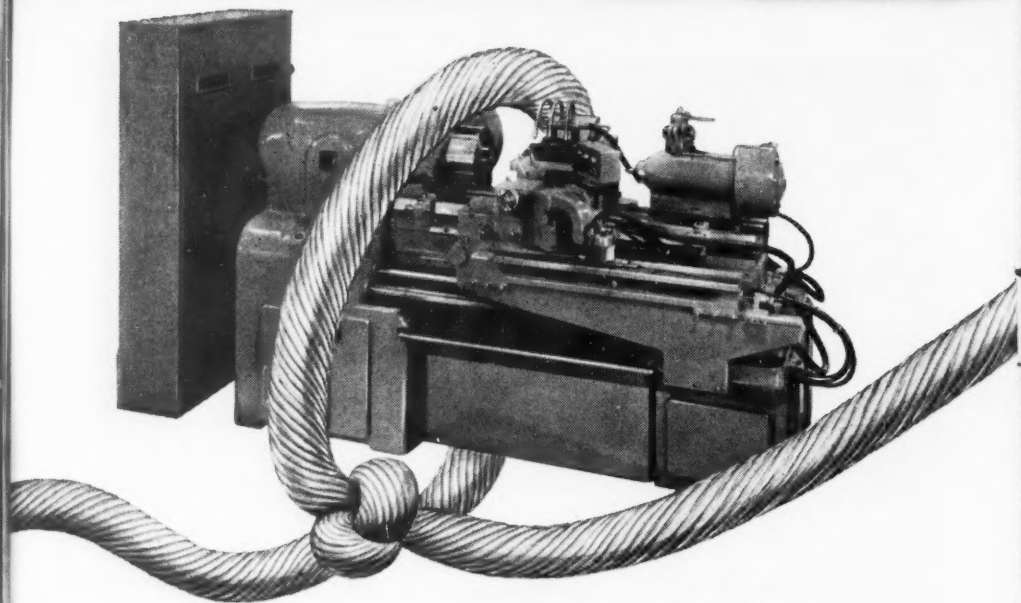
SOLID TOOTH: For general shop cut-off jobs . . . for use on smaller automatic cut-off machines and for cutting jobs where narrow kerf is important.

SEGMENTAL: For especially smooth cuts on production work. High Speed steel toothed segments are securely held in a tough alloy plate by a special tongue and groove design, have quick clearance for faster, freer cutting.

SIMONDS MAKES ALL THREE TYPES OF CIRCULAR METAL-CUTTING SAWS. So you can be sure that SIMONDS will give you *the right saw for your job . . .* for any type of machine. See your Simonds Distributor today, or write the nearest Simonds Office.



Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon, Canadian Factory in Montreal, Que.
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Simonds Abrasive Co., Phila., Pa. and Arvida, Que., Canada



90% SAVINGS.

Here it is in a nutshell, fresh from the Monarch Mona-Matic installation at the Sargent Engineering Corporation of Huntington Park, California. The part is a fork 6" x 2" OD, made from a 4130 chrome-moly

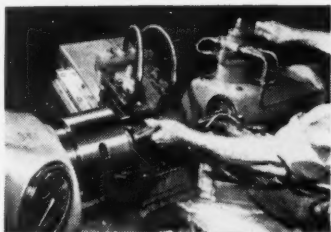
forging heat treated to a hardness of 125,000-145,000 psi before machining—"a tough machining problem from the beginning." Now, look what happened to the production time when the Mona-Matic went to work:

THEN		OPERATION	NOW
Turret Lathe	30 min.	Rough Cut	Mona-Matic 5 min.
Engine Lathe	10 min.	Semi-Finish Cut	
Grinder	10 min.	Finish	
3 Machines	50 min.		1 Machine 5 min.

That makes a 90% reduction in machining time alone, and it's just the start! Set-up time for the job has shrunk from more than 3 hrs. to less than 20 min. One machine has replaced three. Only one operator is required (and he could easily handle two Mona-Matics if necessary). Add all that up—and is there anything

more that we have to add to it?

What is this machine that consistently turns out production savings like this on short runs and long ones alike? That's where the string on the story comes in! Aren't you convinced that you'd better return our handy coupon right now? . . . *The Monarch Machine Tool Co., Sidney, Ohio.*



THE MONARCH MONA-MATIC (Main Illustration and Above, with Work Piece). This is a new and outstandingly successful approach to production metal turning. Use of a single tracer-controlled running tool speeds production, slashes tool costs, tool change time and set-up time, increases accuracy, and slashes time required for subsequent grinding operations. Available with magazine load.

• with a String Attached!



FOR A GOOD TURN FASTER...TURN TO MONARCH

THE MONARCH MACHINE TOOL COMPANY, Sidney, Ohio

Gentlemen: I am interested in your Mona-Matic story and would like to receive your illustrated Booklet, with complete data and job performance reports. Please send me your Booklet 1804 without obligation.

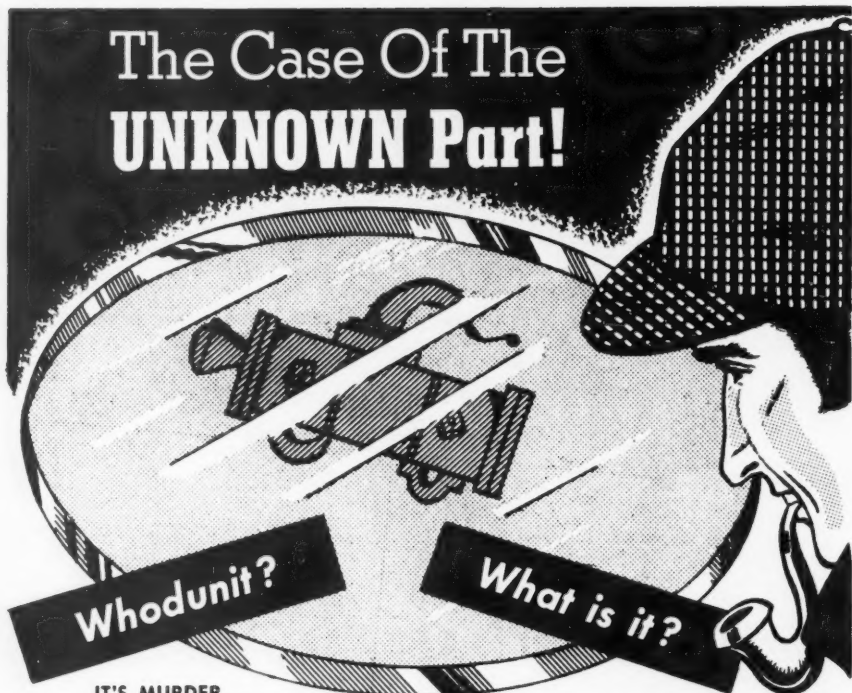
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COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

The Case Of The UNKNOWN Part!



IT'S MURDER...

... for your customers to try to reorder metal parts which aren't properly marked.

And it blackjacks your production, too, when your components can't be identified instantly.

SOLVE THE MYSTERY—

Mark 'Em for Profit...

... with impressions that help you in a hundred ways! Your name, model number, part number, operating instructions, dec-

orative designs and other information can be **ROLLED** legibly and *permanently* into all of your metal products. It's quick, easy and *profitable!*



FREE MARKING ADVICE

Simply send prints or samples of parts to be marked, together with exact lettering and its location, for free recommendations.

WRITE FOR FREE CATALOG...

... It will help you choose the marking equipment—from hand stamps to marking machines—that will suit your *exact* needs.



If It's Worth Making—It's Worth Marking. If It's Worth Marking—Mark It Well.

GEO. T. SCHMIDT, INC.

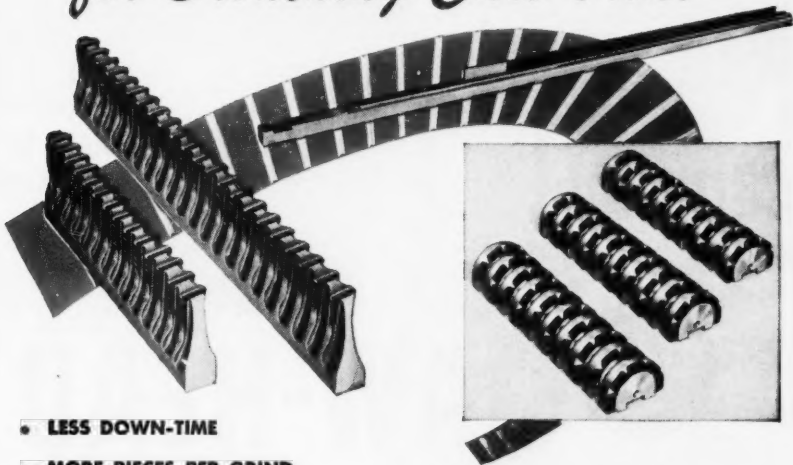
1806 West Belle Plaine Avenue
Chicago 13, Illinois

Specialists in Designing and Producing Carbide Cutting Tools

WESSON

CARBIDE TIPPED BROACHES

for Broaching Cast Iron!



- LESS DOWN-TIME
- MORE PIECES PER GRIND
- FINER FINISHES



CARBIDE tipped broaches are new but Wessonmetal cemented carbide and Wesson Carbide tools are designed and produced with the combined skills of top metallurgists and specialists in carbide cutting tool fabrication. Broaching with Wessonmetal will mean less down-time, more pieces per grind, smooth cutting through scale, sand loaded areas and hard spots.

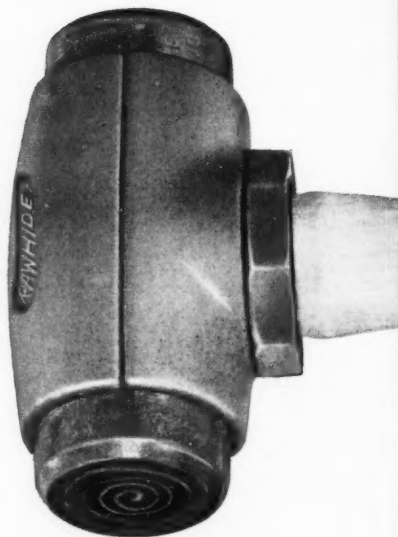
GET A QUOTATION ON WESSON CARBIDE TIPPED BROACHES FOR YOUR JOB TODAY. WRITE DIRECT OR ASK YOUR WESSON REPRESENTATIVE.

WESSON COMPANY *Affiliated with*
WESSON METAL CORPORATION

1220 WOODWARD HEIGHTS BLVD.

• FERNDAL (DETROIT 20), MICH.

The best
"soft" hammer
your money
can buy!



JAW-HEAD

Tough, resilient water buffalo faces deliver needed power, cushioned to protect fine finishes and delicate parts. Faces quickly and easily replaced. Safety-Flare handle gives comfortable, non-slip grip. When you need a "soft" hammer, make sure it's a C/R RAWHIDE Jaw-Head.

For further information write Dept. 22



FACES REPLACED IN SECONDS

Merely loosening a nut releases jaws for replacing faces. Tightening nut holds faces in vise-like grip.

CHICAGO Rawhide **MFG. CO.**

1301 Elston Ave.,

Chicago 22, Ill.

In Canada: Super Oil Seal Mfg. Co., Ltd., Hamilton, Ontario

● Available from leading industrial suppliers. Also C/R Rawhide mallets and Rawhide mauls.

SIZE IDENTIFIED ASSEMBLY SIMPLIFIED

The Only

SIZE-MARKED GEAR GRIP SOCKET HEAD CAP SCREW

The size is clearly incised on the head, can be seen at a glance. It prevents errors by "green" workers, helps veterans also to speed assembly. It saves time and wasted screws when sizes get mixed up.

It's a sales feature for your product. Your customers' maintenance men will like the Size-mark . . . it aids them in reassembling after servicing. Gear Grip prevents slips, speeds work, even when fingers are oily.

Since there is no better Socket Head Cap Screw made, why not get these important extra features offered only by P-K? Ask for samples. Parker-Kalon Corp., 200 Varick St., New York 14, N.Y.



FOR ANY TYPE SOCKET SCREW—
REMEMBER



PARKER-KALON®

Sold through
Industrial
Distributors,
the Supply
Specialists
that serve you

Cold-forged

SOCKET SCREWS



CAP

FLAT HEAD

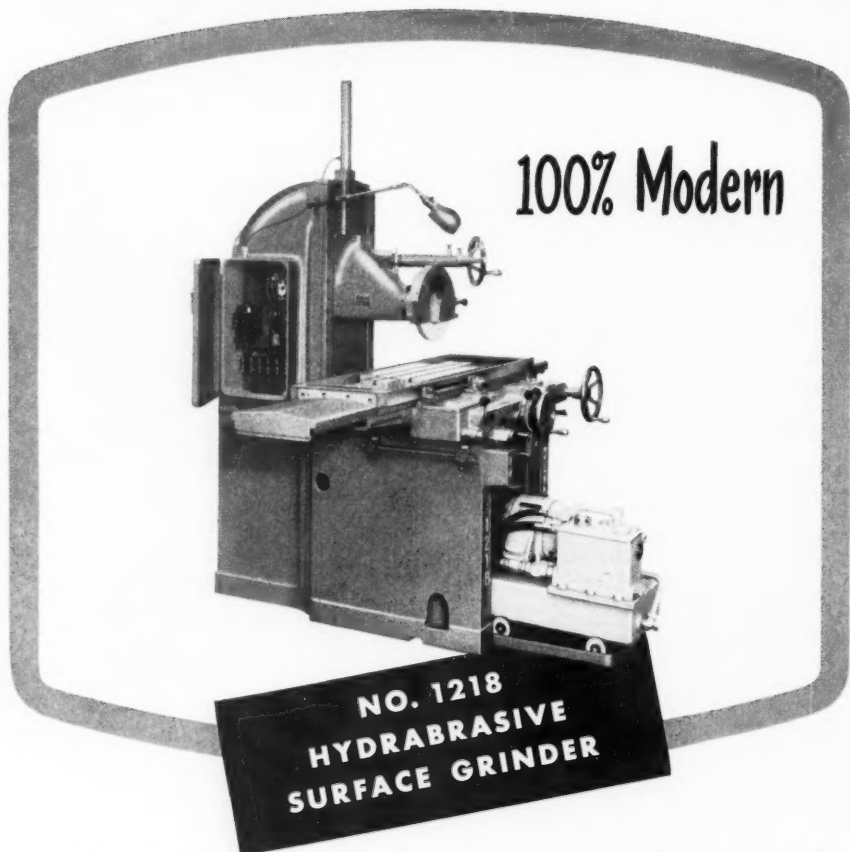
BUTTON HEAD

SHOULDER

SET

PIPE PLUG

HEX KEYS



Beautifully modern yet accessible — that's the No. 1218 Hydrabrasive! There's none of the so-called "modern design" that's only window dressing, with operating parts blocked by streamline covers. On the No. 1218 notice how the hydraulic pump and tank unit rolls out on wheels for easy servicing. Also note the convenient electric control panel that fully meets J.I.C. codes. These are only two examples of Abrasive unit design that means complete accessibility.

The No. 1218 is built for today's high production

grinding schedules. It speeds up all types of surface grinding, and its accuracy is a delight to operator and owner alike. Hydraulic operation provides table speeds from $\frac{1}{2}$ to 90 ft. per min., with $\frac{3}{8}$ " of cross feed in $\frac{1}{5}$ of a second. Specifications include: wide cross travel (12") and moderate table length (18"); saddle ball ways; and 3 HP spindle motor driving a standard 12" wheel. Write for latest complete catalog describing No. 1218 Hydrabrasive. Abrasive Machine Tool Co., 20 Dunellen Road, East Providence 14, Rhode Island.



Abrasive Quality is Reflected in the Finish of Your Product



Putnam *adds* more so you can *remove* more—easier. Extra operations are added to normal practice in grinding end teeth, so you can be certain of non-clogging, free cutting. The special relief thus produced by Putnam eliminates chip-trapping pockets, tends to force chips out.

For the best in end mill performance, specify Putnam — made by end mill specialists.



PUTNAM

2981 CHARLEVOIX AVENUE • DETROIT 7, MICHIGAN

Only ONE can be called the Finest:

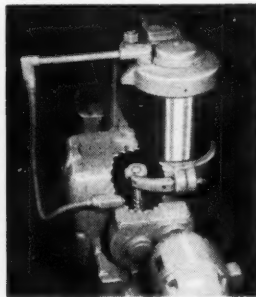
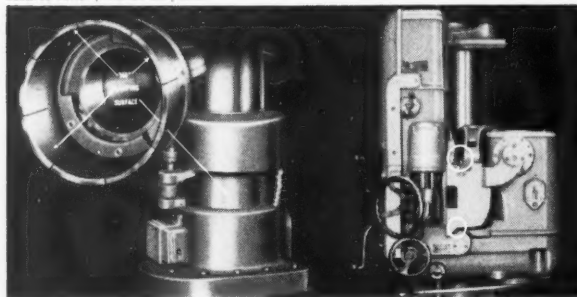
Carlton

...here's another good reason why:

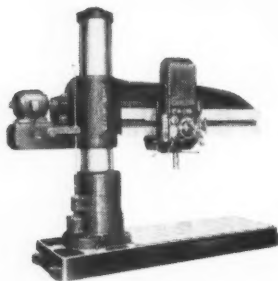
3-unit power clamping

COLUMN AND HEAD CLAMP coupled together so that one pushbutton operates both units for clamp and unclamp. Column clamp gives 20% more rigidity than previous designs, assures better finished surfaces.

ARM CLAMP and unclamp automatically controlled from the raise, lower and stop pushbutton of the elevator unit.



Easier, Faster, More Productive, Cheaper to Operate



Positive and powerful, this exclusive 3-unit power clamping puts precision into the radial drill.

Pushbutton controlled, it's easy and fast to clamp and unclamp, resulting in more production.

Electric power is used only to clamp and unclamp; mechanical power holds units in position while drilling. Results in most economical operation.

Carlton customers—hundreds of them—bought their Carlton radial drills solely on the strength of this efficient clamping. The many other advantages they enjoy—including the exclusive pushbutton control, low hung drive, modern lubrication—explain in part why Carlton is the No. 1 radial choice. But you'll want to know "the hole story"—prices, deliveries—so write or wire us today. THE CARLTON MACHINE TOOL CO., CINCINNATI 25, OHIO.

**small parts
production
increased
with**



STANDARD

speed lathes

The Standard Speed Lathe has no equal for polishing, burring, filing, countersinking and other small parts operations. Available in bench or pedestal models, Standard Speed Lathes guarantee you Speed, Accuracy and Versatility. Horsepowers from 1/3 HP (1 speed) at 600 RPM up to 1 HP (2 speeds) at 3600 RPM.

Also available: Speed-Chucking Lathes up to 5 HP for chucks up to 12". Multiple speeds or infinitely variable speeds. (50 - 3600 RPM.) Write for complete details.

Standardize with
the STANDARD electrical tool co.
MACHINE TOOLS

2487 RIVER ROAD • CINCINNATI 4, • OHIO

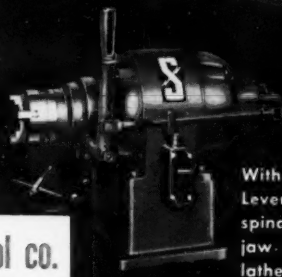
**PEDESTAL
MODEL**

Instantly converts from collet to lathe chuck. Merely mount chuck. Simultaneous action of switch-break-collet through foot pedal control. Hollow Spindle: up to 1" round 5 C collets.



**BENCH
MODEL**

With Hand Lever 1" hollow spindle 4" 3-jaw universal lathe chuck.



LAYOUT FLUID FOR ANY METAL

Send for

YOUR FREE SAMPLE

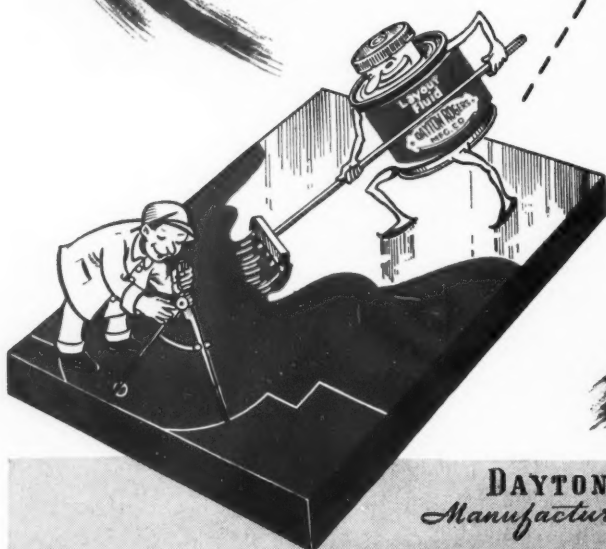
Your local supply house carries Dayton Rogers' Layout Fluid.

Applicable to all metal. One merely wipes the surface clean and then brushes on the Layout Fluid.

Dries Instantly. No waste. Scribed lines are pronounced and contrast to the dark blue background, thus relieving eyestrain.

Assures greater accuracy and speeds up work. You will save time and money on all layout jobs.

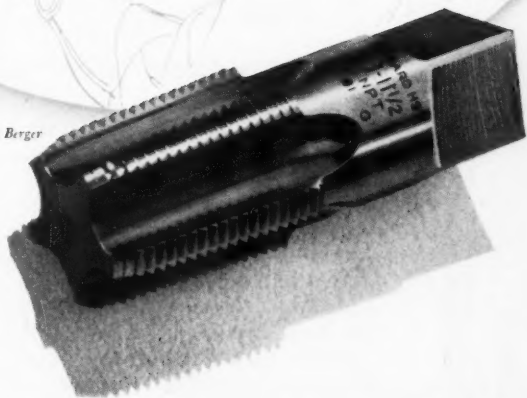
A sample is waiting for you. Send for it today.



DAYTON ROGERS
Manufacturing Company
MINNEAPOLIS 7, MINNESOTA



Unretouched Photograph by Morton Berger



TAPS *by* CARD

No question if it's Card. When you reach for a Card Tap you can be sure you have chosen the best. For built into every Card Tap are years of experience in tap making. Ask your distributor.

Completely stocked offices at Chicago, Detroit, Fort Worth, Los Angeles, New York, San Francisco and Seattle.

S. W. CARD MANUFACTURING CO., MANSFIELD, MASS. • DIVISION OF UNION TWIST DRILL CO.



TAPS • DIES • SCREW PLATES

April, 1953

MODERN MACHINE SHOP 97



INTOCO 2 PIECE CENTERS

**... the answer to ALL your
centering problems**

INTOCO centers are of two-piece design, consisting of a shank and replaceable tip. Just 5 different sizes of tips when used with the proper size INTOCO shanks fit all sizes of Morse, Brown & Sharpe, and Jarno tapers.

Interchangeability of tips is an outstanding feature of the INTOCO line of 2 piece centers. These 5 tips are available in four different alloys to fit the many different applications . . . Cobalt Base Alloy, Nickel Base Alloy, High Speed Steel Alloy, Carbide.

INTOCO Tips are ground all over to give perfect concentricity and seating. To replace, you need only knock out the old and install the new. No special tools required. Write today for free 8 page catalog which gives complete specifications on this line of 2 piece centers.



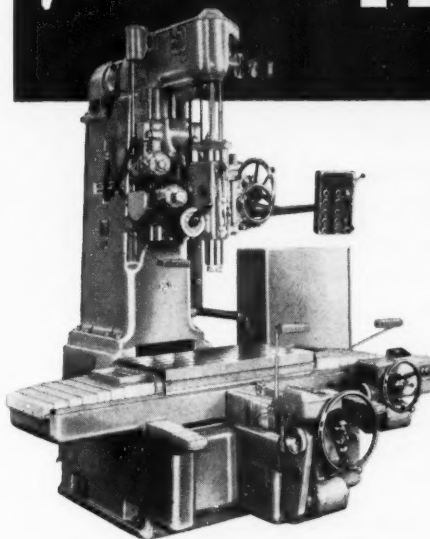
INTOCO SALES CO.

distributors for INTERSTATE TOOL COMPANY

Engineers, Designers and Builders of Special Machinery, Plant Equipment and Tools

427 W. 58th ST. • CHICAGO 21, ILLINOIS

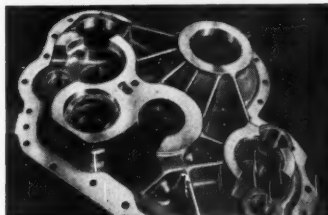
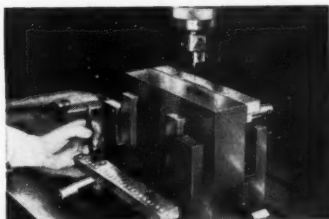
NOW THE NEW PRATT & WHITNEY No. 2E *Electrolimit* JIG BORER



Featuring

- THE NEW *Electrolimit* MEASURING SYSTEM locates the table fast, accurately, and easily; holds wear to a minimum.
- EXCLUSIVE PRECISION PRELOADED BALL ROLL QUILL—Accuracy to "tenths" assured without maintenance or adjustment.
- P&W OPEN SIDE CONSTRUCTION—Convenient for large irregular shaped work.
- AMPLE CAPACITY—Table 22" x 44"; longitudinal travel 36"; transverse travel 22"; table to spindle 27"; special columns 6" and 10" higher also available.

DO JOBS LIKE THESE ON YOUR 2E



Put a 2E to work for you and you've got the practical size for the average toolroom. Also available smaller No. 1E, and the big No. 4E. On the way No. 3E . . . and still available, of course, the famous line of P&W End Measure type Jig Borers.

PRATT & WHITNEY

DIVISION NILES-BEMENT-POND CO.

25 Charter Oak Blvd., WEST HARTFORD 1, CONN., U.S.A.

NAME _____

TITLE _____

COMPANY _____

CO. ADDRESS _____

CITY _____ ZONE _____ STATE _____



INDIVIDUAL VULCAINAIRE DUST COLLECTING UNITS

Are used on surface and other grinders where grinding dust must be removed.

Inexpensive, compact units, with no moving parts. Operated from your present air supply.

Installed in a few minutes, eliminating need for costly centrally located dust collecting systems.

The collector element is mounted on the side of the machine. Quickly cleaned, requiring no refills.

Vac-suction pick-up device (vacuum nozzle) is mounted on the grinding wheel guard or close to grinding wheel on other applications. This mounting permits constant contact with dust as the wheel is moved up or down.

A simple needle valve operates the unit, and can be shut off whenever the machine is not in use.

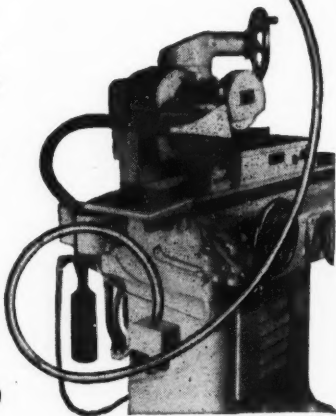
Available in two sizes: 700 series for grinding wheels 7" dia. or less—200 series for wheels 2" dia. or less.

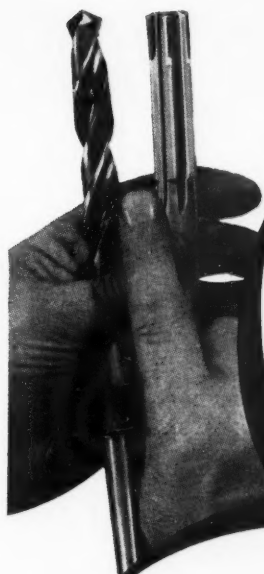
Made by the makers of Vulcanaire The jig grinding attachment.

*Write on your letterhead
for "Dust Collector" Booklet.*

VULCAN TOOL CO.

PRITZ AND HIGHLAND, DAYTON 10, OHIO



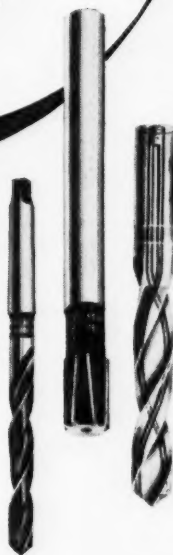


"OLD HANDS"

who know and use
good tools
specify "Double Circle"
because of
QUALITY

The outstanding performance and long life associated with Double Circle Tools doesn't just happen. It is the result of exacting inspection to secure top quality. This inspection and quality check includes every individual tool. It starts with raw material . . . and is carried out on every manufacturing operation until the tool is checked out, finished and perfect . . . a precision product meeting rigid above-average standards.

It is the requirement of CHICAGO-LATROBE, makers of Double Circle Tools, to produce nothing less than precise, top quality tools that give outstanding performance and long life. Like "Old Hands" that recognize and know top quality, through long years of experience, you too, can enjoy using the best by specifying Double Circle Tools the next time you order.

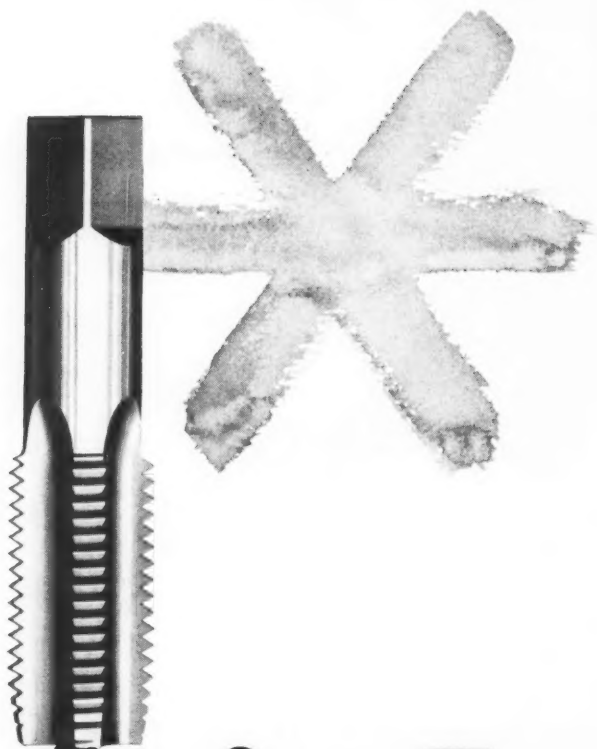


ORDER FROM YOUR
INDUSTRIAL DISTRIBUTOR



CHICAGO-LATROBE

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Try **Bay State Taps**
BAY STATE TAP & DIE COMPANY • MANSFIELD MASS.

*On nearby shelves of industrial supply distributors.

MCCROSKY

**COST
CUTTING
TOOLS**

V-centering *Block Type*

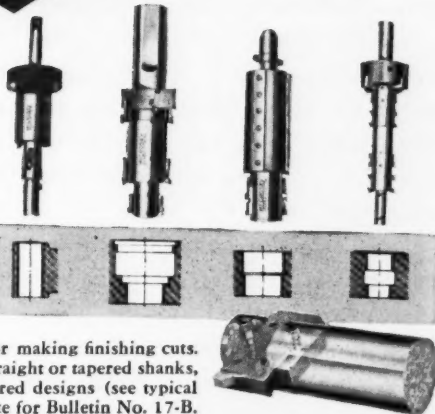
BORING BARS

**Ruggedly built for
accurate low cost
dependable operation**

● An individually ground and hardened, tapered V-key centers the block and cutting blades — and holds them rigidly enabling these bars to produce more pieces — better — at lower cost.

The cutter block with heavy oversize blades is backed up with a hardened thrust block. A slight release of the tapered V-key permits the block to be floated with extreme accuracy for making finishing cuts.

Furnished in a wide range of stock sizes with straight or tapered shanks, with or without pilots, also in specially engineered designs (see typical examples above) to meet any requirement. Write for Bulletin No. 17-B.



MCCROSKY *Universal* MILLING CUTTERS

Body can rotate either right or left hand. Consequently, selecting blades with tips of proper material mounted at proper angles produces a cutter that meets any requirement. Write for Bulletin 531.



MCCROSKY *Jack-Lock*® MILLING CUTTERS

Complete line, fitted with high speed steel, cast alloy or carbide tipped blades. Sizes from 3" to 24" to meet any requirement. Write for Bul. 17-M.



MCCROSKY *Suber*® *Adjustable* REAMERS

Chucking reamers with straight or tapered shanks, also shell reamers with tapered holes or large straight holes. Standard sizes from 15/16" to 6" in diameter. Write for Bulletin 18-R today.



MCCROSKY *Turret* TOOL POSTS

These tool posts permit tools to be swung into position quickly, indexed accurately, and locked rigidly. Four styles—11 sizes. Write for Bul. 17-T.



MCCROSKY *Wizard*® QUICK-CHANGE CHUCKS

McCrosky's Wizard Quick-Change Chuck and Collet outfits hold tools centered and rigid. They enable the operator to change tools without stopping or slowing down the spindle. Write for Bulletin 18-C today.



MCCROSKY *Multiple Operation* TOOLS

McCrosky "Specials" combine two or more boring, facing, chamfering or reaming operations into a single tool, cutting set-up time and costs. Write for Bulletin 17-S today.



MCCROSKY

**TOOL
CORPORATION**
MEADVILLE, PA.

Engineering and Sales Representatives in the Principal Cities

Lusol IS MORE THAN A COOLANT ...it's a Service

Sometimes a smart coolant salesman can make minor adjustments on a machine tool, which enable him to speed up its operations. Then he says, "Look what *our* coolant has done for you! Use it on all your machines."

Lusol service engineers don't depend on such sketchy performance to prove-in their product. They clean out the machine you have assigned for the initial test, then install Lusol in proportions that are proper for the task involved. They draw on their extensive tooling experience to help you get the most out of that machine.

Foremen and operators see what Lusol is accomplishing there — faster speeds and feeds, finer finishes, longer tool life, smoke-free atmos-

phere, freedom from skin irritation. They say, "Let's try Lusol on that job, too. It's a tough one." And so the use of Lusol spreads, not through sales pressure, but from within each user's organization.

"Will Lusol work in my plant?"

The fact that Lusol *works* on turning, milling, grinding, drilling, roll-forming and so on has been demonstrated time after time. We can cite hundreds of case histories testifying to that. Now the question is, "Can your machines take full advantage of what Lusol has to offer?"

Write for the booklet, "Lusol Gets to the Point," for evidence of its time- and money-saving ability. Then ask to have our representative call; he will make the necessary arrangements to prove-in Lusol at your plant.

**Send for a free copy of the booklet
"Lusol Gets to the Point"**

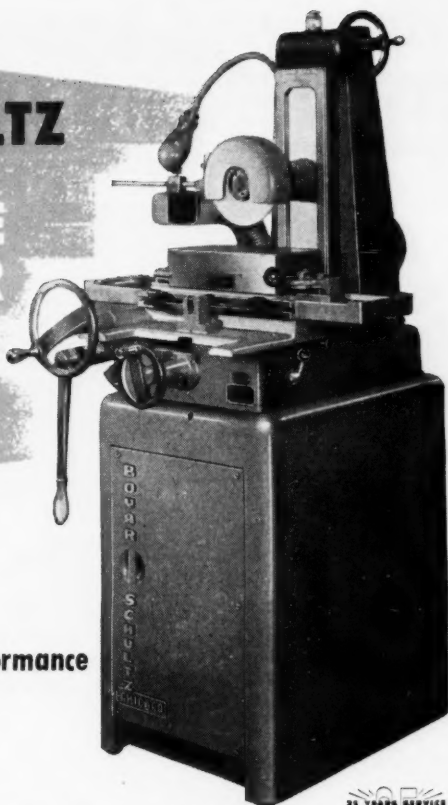
F. E. ANDERSON OIL COMPANY, INC.
Box 216-J, Portland, Connecticut

BOYAR-SCHULTZ

6-12 SURFACE GRINDER

Provides all 3

- ✓ Surface Grinding to Gage Tolerance
- ✓ Dependable Grinding Performance in Production
- ✓ Positive Dust Protection



It has the capacity to handle the biggest part of the tough assignments encountered in any shop. It has the accuracy to obtain the high precision needed in tool and gage making. In production it proves so sturdy that long runs, with accuracy, are no problem.

The new Dust Collector Unit, made especially for No. 6-12 Surface Grinder is furnished as optional equipment and is built into the grinder at the factory. With this Dust Collector, no more floor space is required.

Big Machine Performance—Small Machine Cost

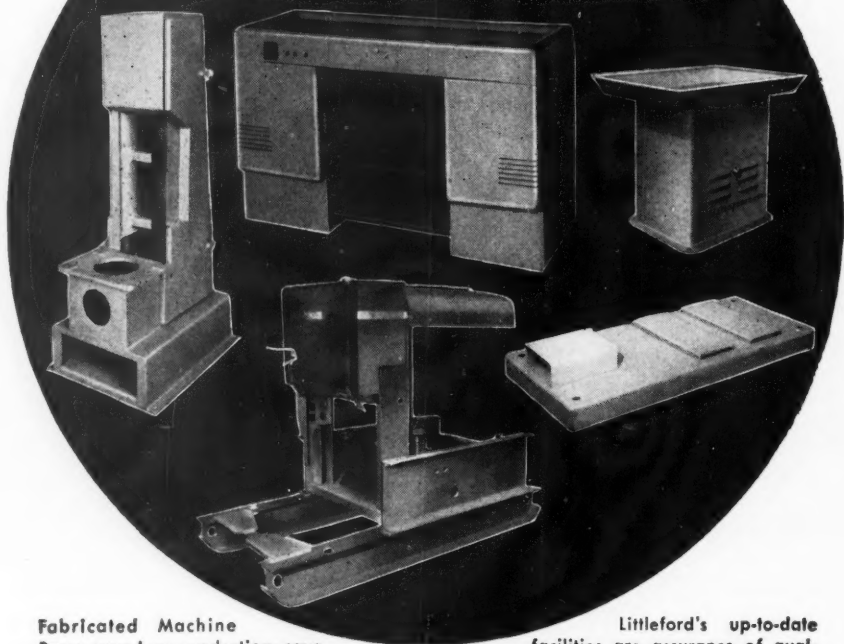
Write for descriptive literature

BOYAR-SCHULTZ CORPORATION
2120 Walnut Street Chicago 12, Illinois



LITTLEFORD BASES

FOR MODERN INDUSTRY



Fabricated Machine Bases speed up production; save valuable man hours. Fabricated Bases eliminate machining operations, make alterations easy without expensive pattern changes. Welded Bases are stronger and lend themselves to modern design.

Whether you need one or hundreds of Fabricated Bases, and regardless of shape,

Littleford's up-to-date facilities are assurance of quality workmanship. In addition to Bases Littleford can fabricate Pans, Guards, Special Metal Parts, and Sub-assemblies to facilitate fast and accurate production. Remember there's no substitute for experience. Send blueprints today for an estimate of cost.

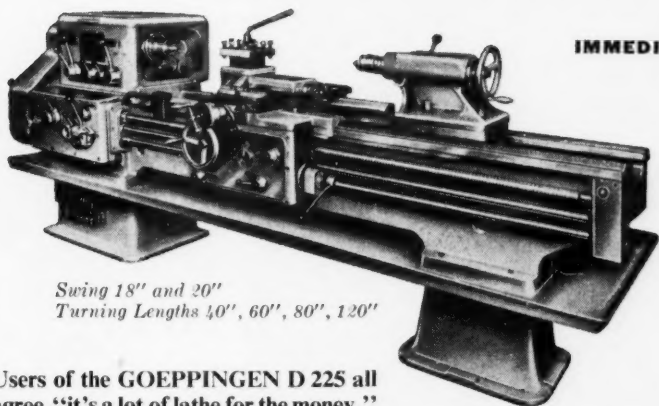
FABRICATORS
OF
PLATE AND
SHEET METAL
PRODUCTS
FOR INDUSTRY
SINCE 1882



LITTLEFORD

LITTLEFORD BROS., INC.
433 EAST PEARL STREET
CINCINNATI 2, OHIO

New high-speed, heavy-duty GOEPPINGEN Engine Lathe costs less than you'd expect



**IMMEDIATE DELIVERY
FROM STOCK**

*Swing 18" and 20"
Turning Lengths 40", 60", 80", 120"*

Users of the GOEPPINGEN D 225 all agree, "it's a lot of lathe for the money."

That's what Goeppingen engineers designed it to be. And by concentrating on only one basic type, they brought it within the price range of the small as well as the large plant.

Rugged and fast for high-speed machining of large castings and forgings with carbide tools, the GOEPPINGEN is precise enough for use as a toolmaker's lathe. All lead and feed screws, dials and graduations are in inch dimensions. Accurate settings are maintained by single lever action of longitudinal and cross feeds carried in precision bearings.

Factory trained servicing is as close as your telephone from **Orban Service Centers** in Cleveland, Detroit, Newark. Stock parts from Cleveland.

SPECIAL DESIGN FEATURES

Extra-wide bed without gap adds greater swing diameter, handles work up to 21".

V-belt drive transmits power through 10 or 7½ h.p. motor to geared head...eliminates vibration. 18 spindle speeds 22-1120 rpm.

Hardened and ground gears and shafts automatically lubricated. *Drive shaft on headstock* has Ortlinghaus multiple disc clutch for forward and reverse motion; quick-acting mechanical brake.

Self-contained gearing unit for thread-cutting. Dial feed simplifies changes of feed and pitch. 48 threads up to 28 pitch *without change gears*.

Bondycop hydraulic copying attachments for 20", 40" and 60" lengths. Other attachments for taper turning; boring and thread cutting operations; patented self-centering rest for mass production work.

Write today for complete specifications.



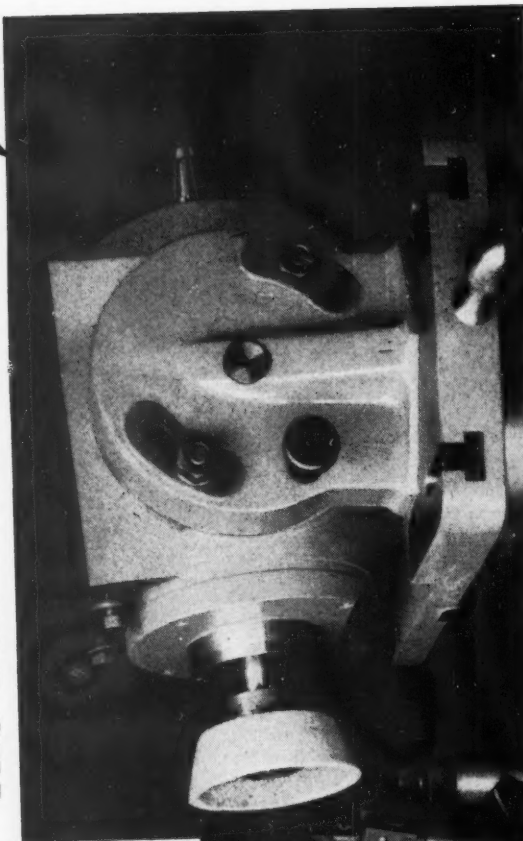
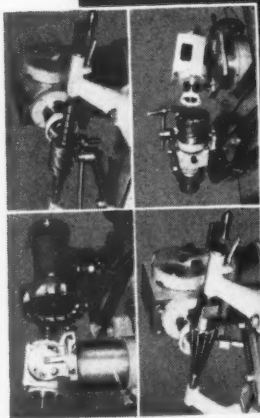
KURT

ORBAN

COMPANY, INC.

205 E. 42nd St., N. Y. 17 • 4220 Prospect Ave., Cleveland 3 • 19450 James Couzens Highway, Detroit 35
1939 Santa Fe Ave., Los Angeles

The TOOL GRINDER For You!



**The Modern POPE Super
Precision 1 HP, 3600 RPM
Motorized Tool and Cutter
Grinder Head With
Angular Adjustment
In A Vertical Plane**

This new unit is super-precision throughout... it is designed particularly for replacement of tool grinder heads which do not have the extremely useful angular adjustment in a vertical plane.

It will more than pay for itself — reduces set-up time — makes wheels cut faster — spark out quicker — produces the kind of cutting edge on your tools that stands up and cuts longer.

Pope Motorized Grinder Heads are available for most makes of cutter and tool grinders. Ask for quotation to cover your grinder.

No. 92

Specify **POPE**

PRECISION SPINDLES

POPE MACHINERY CORPORATION

Established 1920

201 RIVER STREET • HAVERHILL, MASSACHUSETTS



Red Shield says:

**"STANDARD for tough jobs
since 1881"**



as near as your telephone



Call your Industrial Supply Distributor
for Shield Brand Reamers. Specialized
factory service available everywhere.

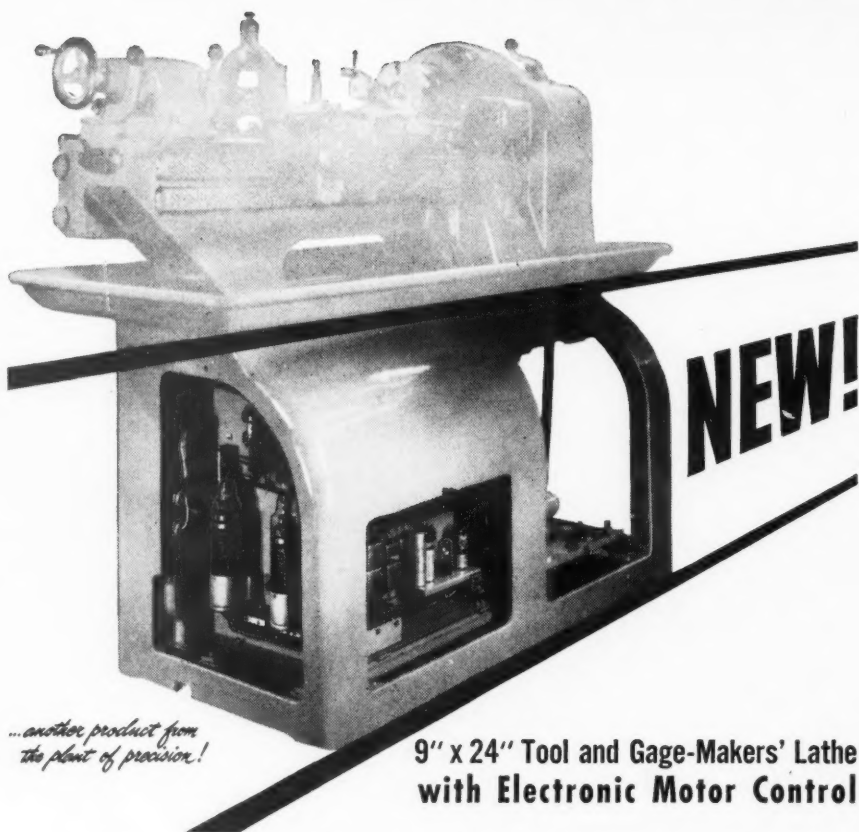
STANDARD TOOL CO.

3950 CHESTER AVENUE

CLEVELAND 14, OHIO



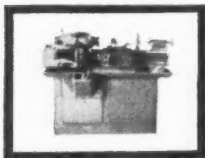
NEW YORK • DETROIT • CHICAGO • DALLAS • SAN FRANCISCO



9" x 24" Tool and Gage-Makers' Lathe with Electronic Motor Control

Now you can have the advantages of quiet, simple, modern Henley Electronic Motor Control on the Henley 9" x 24" Tool and Gage-Makers' Lathe. These advantages include stepless spindle speeds from 25 to 3000 R.P.M. by potentiometer control of both field and armature of the 3 H.P. d-c motor. Exceptionally close speed control is obtained even under changing load. I.R. compensation gives full torque at low speeds over the complete armature control range. A full stop from

maximum speed is accomplished in approximately 1½ seconds. Starting, stopping or reversing, even at 3000 R.P.M., is accomplished smoothly and rapidly. This new drive is optional equipment, and full information is available in our new 9" x 24" Lathe catalog. Write for your free copy! It gives full details on the new drive as well as other features of the Henley 9" x 24" Lathe, which guarantee precision output with minimum effort.



MODERN
Henley



THE HENLEY MACHINE CO., INC.
Main Office and Plant:
TORRINGTON, CONNECTICUT
Dealers in Principal Cities

Bridgeport

TURRET MILLING MACHINES

Continue to make other methods obsolete

NO matter how you figure it, today's work cannot be handled economically on yesterday's machines and old fashioned tooling . . . In terms of speed, accuracy, convenience and costs, obsolete methods are a liability . . . never an asset. How are your machines dated . . . '52 . . . '42 . . . '32 . . . or what? Can you mill, drill, bore or shape . . . at all angles of the work . . . without changing set up?

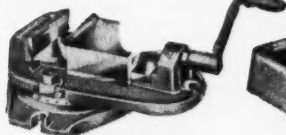
We suggest you investigate the advantages offered by "BRIDGEPORTS" and compare the possibilities with what you are trying to accomplish on existing equipment. Once you've done this, you'll do what countless other shops are doing . . . and replace obsolete machine tools with modern, proved BRIDGEPORT TURRET MILLING MACHINES.

Condensed Specifications

8 Spindle Speeds . . . from 80 to 2720 RPM.
Back Geared Spindle Drive Unit: utilizes full power at all speeds without belt slippage.
Power Feed to Quill: 3 steps — .0015, .003 and .006 in. per spindle revolution.
Quill Travel: 5".
Spindle Brake and Lock for convenience in changing tools.
Collet Capacity: up to 3/4" diameter.



RIGHT ANGLE ATTACHMENTS



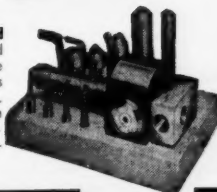
Milling Machine Vise

An improved vise providing great gripping power. Streamlined for attractiveness and equipped with coolant trough. Rigid holding through screw of large diameter. Made in two sizes: 5"x3 1/2" and 6"x5" jaw openings.

(Left) Light Duty
... for right angle milling and drilling narrow, deep molds and cavities.

(Left) Heavy Duty
... for milling and drilling at right angles. Fits both Master and 1 HP Bridgeport Heads.

No. 2 Boring Head
Boring Tools and Holder provide the means of boring holes up to 6" diameter. Available for use on Bridgeport 1 HP Milling, Drilling and Boring Attachment.



Bridgeport

MACHINES, INC.

Bridgeport, Connecticut

Manufacturers of High Speed Milling Attachments and Turret Milling Machines



Bright boy makes a better man...



Much better . . . in *time savings alone* by as much as 50%, combining burring, cleaning, finishing, polishing into *one operation!* And Brightboy gives *more big "plus" advantages:* superb work quality, operation-saving versatility and adaptability far greater than conventional abrasives. With Brightboy you get the working advantages of *both* rubber and abrasive. Brightboy's extensive time-and-work-saving features are due to its unique *rubber-cushioned*, light-grind action. You're missing something big if you don't learn all there is to learn about Brightboy **NOW!**

HOW BRIGHTBOY SAVES PRODUCTION TIME

Use it for countless jobs regular abrasives cannot do—PLUS low cost, "every-day" finishing. Bridge the gap between the rough grind and the buff in one operation! Work to close tolerances. Shape to contour. Obtain a wide variety of conventional and special finishes and patterns—damaskeening, for example. No before-use preparation or dressing needed. No skilled labor necessary.

TRY A TEST!

Ask your dealer for this sample card containing Brightboy blocks in 3 textures, and for the Brightboy Catalog-Manual. Write us if he cannot supply you—or on any problem where finishing is involved.



WHEELS, STICKS,
RODS, BLOCKS
in three textures
for machine and
manual operations



GENERAL USES—A FEW OF MANY:

Remove light digs, tool and heat marks. Clean welded and soldered joints. Finish dies and molds. Burr stampings, castings, machined parts. Maintain tools, equipment, machinery, parts.

BRIGHTBOY FINISHES MANY MATERIALS

—defense products and civilian goods in
All Metals • Plastics • Wood • Glass •
Hard Rubber • Pressed and Laminated
Materials and Combinations.



**BRIGHTBOY INDUSTRIAL DIVISION
WILSON ROBERTS RUBBER CO.**

6th Ave. & No. 13th Street Newark 7, N. J.

America's Pioneer Manufacturer of
Rubber-Bonded Abrasives

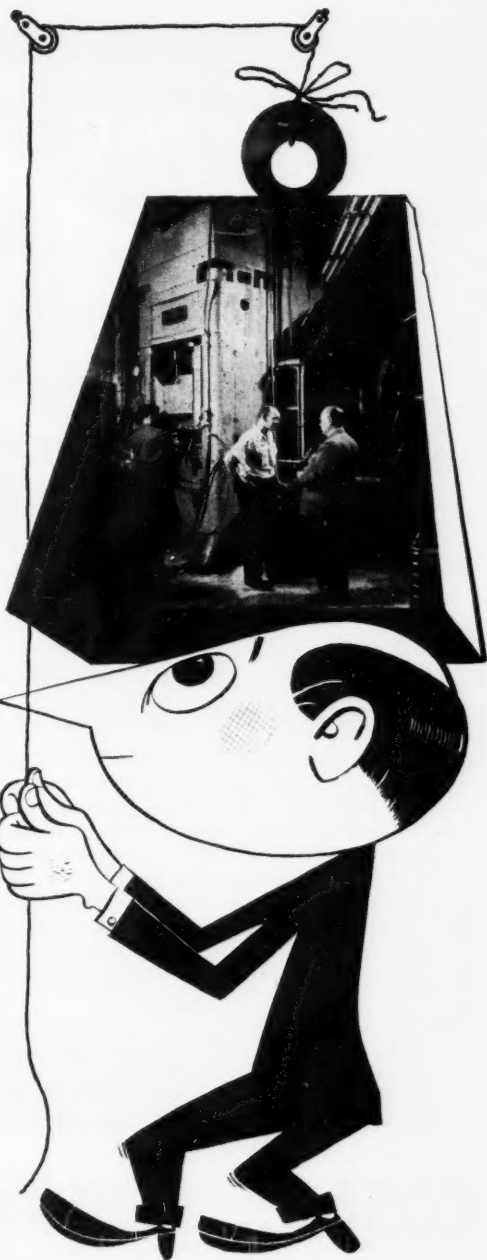
Take some of the
pressure off
hydraulic press
maintenance
with

**GULF QUALITY
HYDRAULIC OILS**

A recent investigation into the causes of down time of hydraulic equipment revealed that an estimated 90% of all down time can be traced to the condition of the hydraulic oil. This is right down our alley because we at Gulf know from experience in hundreds of plants that it pays to use only top quality oils in hydraulic systems—oils that will not sludge, and that protect against rust. Saving a few cents per gallon on the initial fill is false economy!

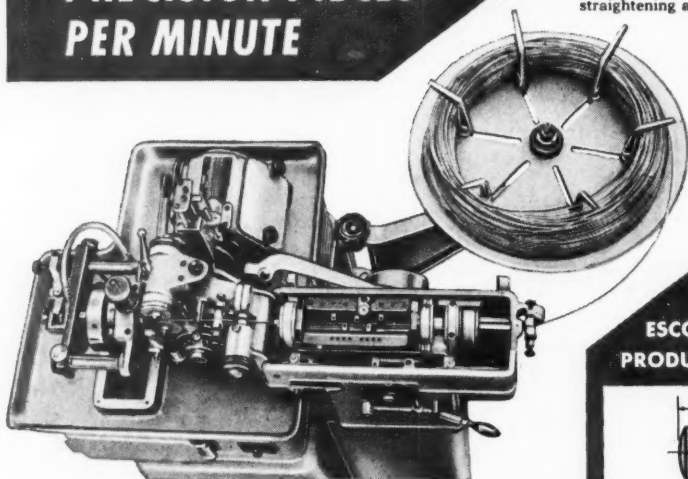
For complete information on Gulf's line of quality hydraulic oils, ask a Gulf Sales Engineer to call. Write, wire, or phone your nearest Gulf office today.

**GULF OIL CORPORATION
GULF REFINING COMPANY
PITTSBURGH 30, PENNA.**



GET UP TO 100 SMALL PRECISION PIECES PER MINUTE

Below: ESCO ROTOMATIC DS 1
with optional wire-
straightening attachment

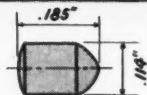


PARTS UP TO 5/32" DIA. X 1" LONG MACHINED AS CLOSE AS $\pm .00025"$ FROM COILS OR BARS

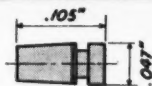
A Swiss automatic form-turning and cut-off machine with optional wire-straightening attachment—you get high-speed production from coils or bars of any length. Coil-feeding speeds and economizes your operation by eliminating bar ends and bar loading time. Machining is done by two cutting tools mounted in a cam controlled tool head. The tool head rotates around material which is fed, guided, and clamped by a collet and a guide bushing. Machined parts are smooth, straight and *entirely burr-free* when they are delivered to the tray *separate from the chips*.

Get more information today about this
machine and see how it can boost your
production and cut your costs.

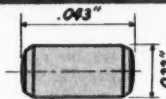
TYPICAL ESCO ROTOMATIC PRODUCTION RATES



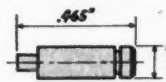
100/min.—brass



63/min.—nickel-silver



50/min.—nickel



10/min.—mild steel

COSA CORPORATION

405 Lexington Ave., New York 17

IN DETROIT AREA contact DETROIT-COSA CORPORATION, 16923 James Couzens Highway, Detroit 55, Mich.

Your source for all Precision Machine Tools—
from Small Bench Lathes to Large Boring Mills

F R O R I E P

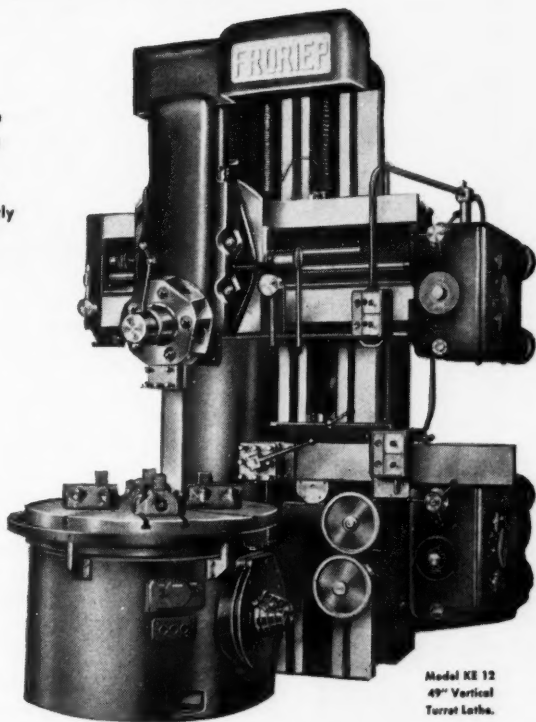
VERTICAL TURRET LATHES

for • • • **High Cutting Capacity**
 • **Quality Surface Finishes**
 • **Convenience of Operation**

The rigid construction and ample range of speeds provide for maximum cutting efficiency with either carbide or high speed tools. Down time is minimized as all controls are centrally and conveniently located. Fine adjustments for cutting tools are so placed that operators can closely observe cutting edges—even on small workpieces.

The Froriep Vertical Turrets are made in four sizes having 39", 49", 55" and 63" diameter tables. They can be furnished with thread cutting equipment, taper turning equipment, tripping device, tracing device with electric tracer control and coolant system.

Write for catalog fully describing these Vertical Turret Lathes.



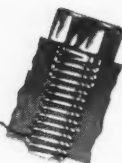
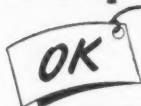
Model KE 12
49" Vertical
Turret Lathe.

COSA CORPORATION
 405 Lexington Ave., New York 17

**Your source for all Precision Machine Tools—
 from Small Bench Lathes to Large Boring Mills**

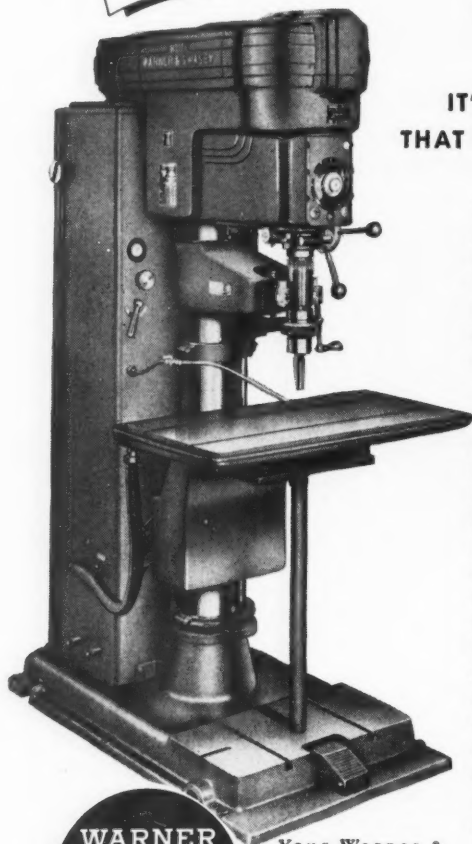
IN DETROIT AREA contact DETROIT-COSA CORPORATION, 16923 James Couzens Highway, Detroit 35, Mich.

stock pile



or scrap pile

REJECT



**WARNER
&
SWASEY**

Cleveland
PRECISION
MACHINERY
SINCE 1880

Your Warner & Swasey Field Representative will be glad to show you how a Precision Tapping and Threading Machine can increase production and cut scrap loss in your shop.

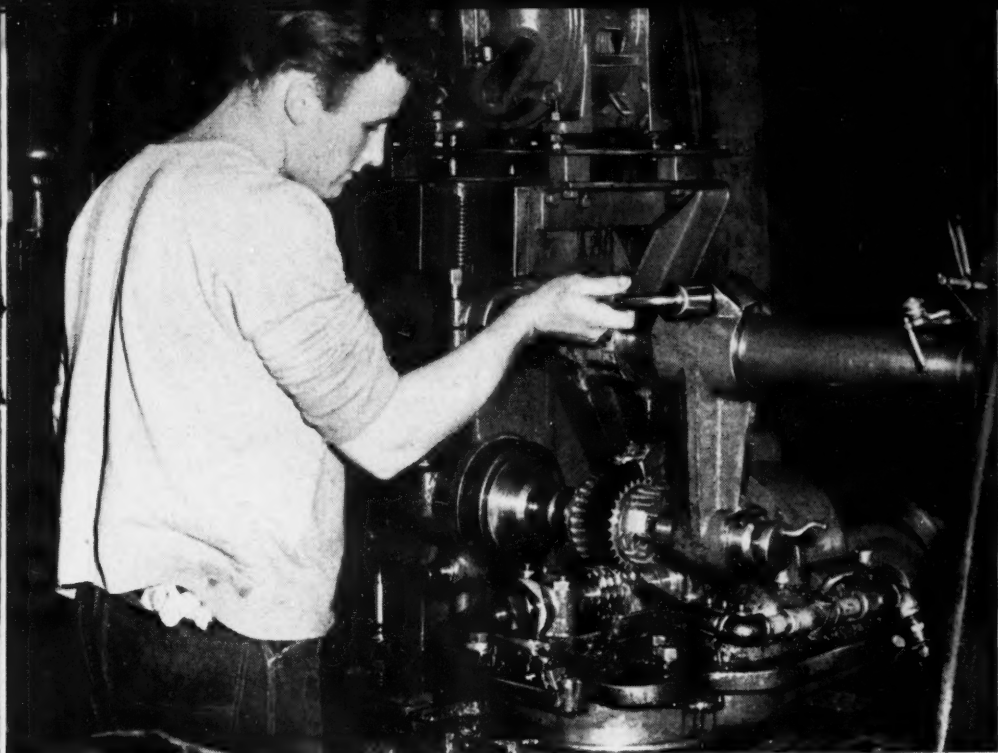
IT'S THE FINAL OPERATION THAT CAN MEAN THE DIFFERENCE

PRECISION tapping and threading is often the final step in finishing a piece that has undergone many previous machining operations. Here is where inaccurate fits or thread errors can mean costly scrap loss, and upset your production schedules.

Warner & Swasey Precision Tapping and Threading Machines drastically reduce these wasteful rejects. These machines feature a radically different and exclusive leading-on principle, with solenoid-actuated guide fingers operating on a lead screw. This provides positive control on tapping and retracting strokes, completely eliminating backlash or drag. A super-sensitive clutch, adjustable to safe torsional resistance, stops the tapping operation immediately when the tap hits a hard spot or chip accumulations, saving spoiled threads or broken taps. Precision depth control assures depth accuracy to within 1/10th of a revolution of the tap or die.

These and other special features insure fast, extremely accurate tapping to Class 3 or 4 gage fits in a wide range of materials—from tool steel to plastics.

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS WITH WARNER & SWASEY MACHINE TOOLS, TEXTILE MACHINERY, CONSTRUCTION MACHINERY



Hob life increased 75%

● The Gear Products Company, St. Louis, Missouri, tried various cutting oils for the hobbing of door latch spur gears from a *free machining* steel. An average of only 600 pieces could be produced before hobs required sharpening.

A Standard Oil lubrication specialist recommended PREMIER Cutting Oil. With the use of PREMIER, an average of 1050 pieces have been produced before hobs have required sharpening—a 75% increase of hob life. Less downtime for tool changes has resulted in higher production. Fewer sharpenings have significantly reduced tool costs.

The Gear Products Company, spe-

cializing in precision gears, gear trains, now uses PREMIER Cutting Oil for the majority of its gear cutting jobs. This has simplified both stocking and application of cutting oil.

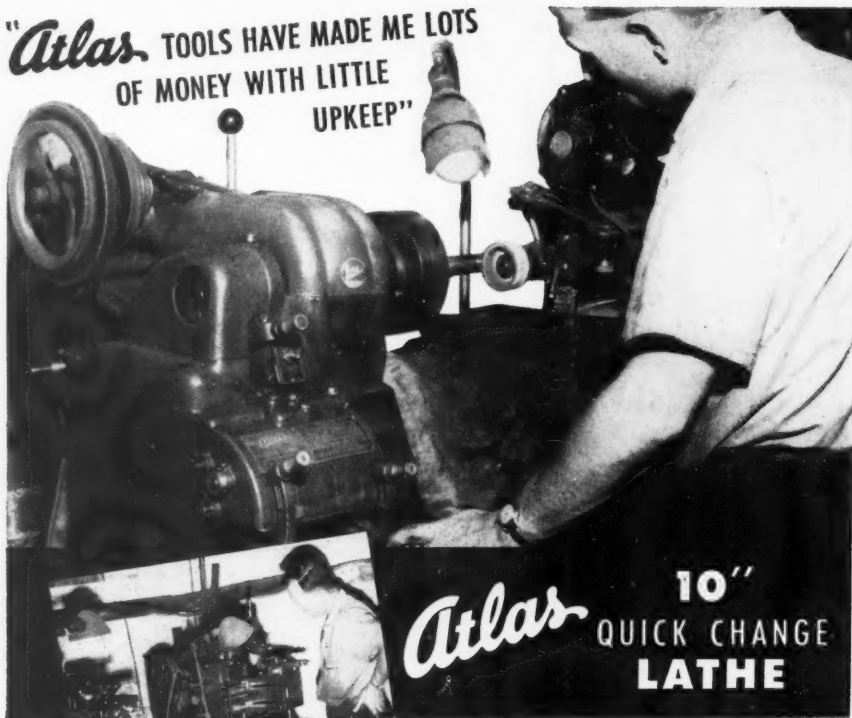
Whether you have a specific problem or are looking for better results, there's a good possibility that a Standard Oil lubrication specialist can help you. His experience and special training are backed by one of the finest and most complete lines of cutting oils and lubricants on the market. You can contact him easily by phoning your local Standard Oil (Indiana) office. Or write: Standard Oil Co., 910 S. Michigan Ave., Chicago 80, Ill.

STANDARD OIL COMPANY

(Indiana)



**"Atlas TOOLS HAVE MADE ME LOTS
OF MONEY WITH LITTLE
UPKEEP"**



**Atlas 10"
QUICK CHANGE
LATHE**

The rugged, precision-built 7" shaper, and milling machine, are other Atlas tools that have made the J. H. Ferraby Machine Shop "lots of money with little upkeep." The Atlas shaper is the only precision 7" shaper equipped with Timken bearings. The Atlas miller is the lowest cost precision milling machine.

Low first cost . . . low upkeep . . . dependable precision . . . exceptional versatility . . . *everything* recommends the Atlas 10" lathe for outstanding service in tool room, machine shop, or maintenance, as the J. H. Ferraby Machine Shop, specializing in precision work, reports. Their Atlas "has not had \$10 spent on it in five years."

The Atlas precision-ground bed, rugged accurate construction, Timken bearings, 16 spindle speeds, instant selection of 54 threads or feeds, plus power cross and longitudinal feeds, are features that deliver *top* efficiency. See these features at your Atlas dealer's, or write today for the latest catalog.

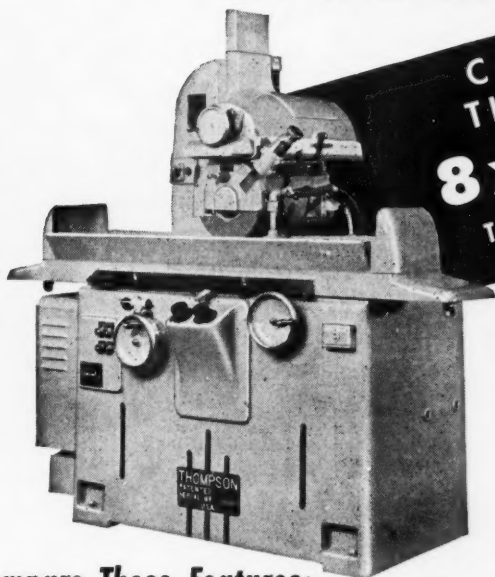
ATLAS PRESS COMPANY

412 N. PITCHER ST. • KALAMAZOO, MICH.

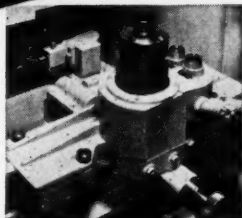
Atlas

DEPENDABLE QUALITY TOOLS SINCE 1911

Thompson Type 2F SUPER PRECISION Tool Room Grinder



COMPARE
THIS NEW
8x10x24
TOOL ROOM GRINDER
(Write for specifications)



MAGNIFIED TEMPLATE DIAMOND WHEEL DRESSER with ten to one magnification available in universal manually operated and electric. Other auxiliary Thompson Type 2F equipment includes "Coolant Thru the Wheel" feature and Magnetic Chucks with control.

Compare These Features:

- HARDENED AND GROUND cross slide ways completely sealed.
- One shot lubrication to cross slide ways and internal saddle bearings.
- HARDENED AND GROUND sealed anti-friction vertical slide.
- HARDENED AND GROUND BED WAYS with automatic lubrication.
- 3600/1800 R.P.M. 2 speed wheel head. Heavy alloy steel spindle heat treated, runs in super precision ball bearings accurately preloaded, lifetime lubricated.

- Handy control panel.
- Elevation micrometer stop graduated in .0001".
- GROUND THREAD FEED SCREW.
- Automatic wheel TRUING device.
- Longitudinal hand wheel with automatic engagement.
- Hydraulic head movement throttle with rapid traverse.
- Hydraulic table movement throttle.
- Elevating hand wheel graduated in .0005".
- GROUND THREAD FEED SCREW.

WRITE TODAY for complete specifications and performance data. Address Dept. 10, Thompson Grinder Co., Springfield, Ohio.

- ◆ The only manufacturer of a complete range of heavy duty and light duty surface and contour grinders for industry.

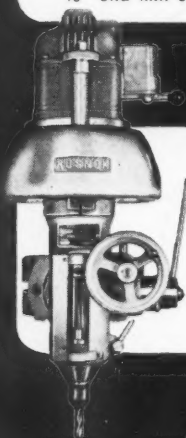
The Thompson Grinder Company, Springfield, Ohio

Thompson
SURFACE
Grinders

RUSNOK MILL HEADS

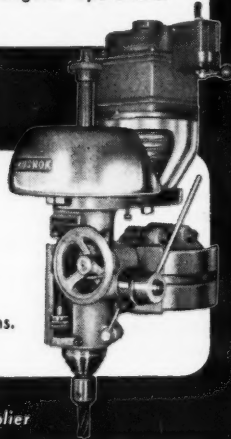
1/4 H. P. CONVERTICAL MILL HEAD

Only low cost mill head with quill travel attachment.
High speed medium-light operation.
For bench, floor and pedestal mills.
Fits milling machines with overarm 1 1/2" to 3".
3/8" end mill capacity.



1/2 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
3/4" end mill capacity.
For vertical, horizontal and angular operations.



1 H. P. MILL HEAD

HEAVY DUTY MILLING ATTACHMENT
Fits milling machines with 3" to 5" overarm.
3/4" end mill capacity.
For vertical, horizontal and angular operations.

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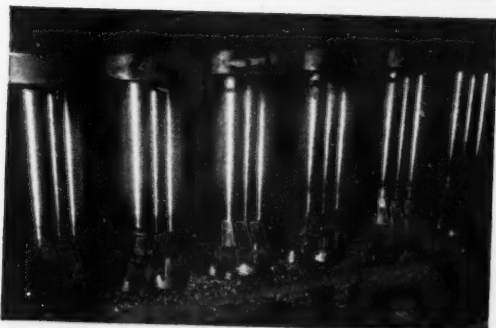
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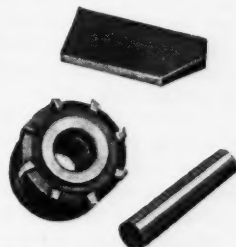
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over the editor's desk

R. S. Mystery

Several weeks ago the Manager of our Reader Service Department showed me a green card from the February issue bearing the postmark Independence, Missouri, on which the "inquirer" for additional information had failed to sign his name. It sparked our imagination. We could visualize a man on one of his famous walks, stopping to visit with a friend who operated a local metalworking establishment, seeing a copy of MMS packed full with ideas for manufacturing metal products, and concluding that items in a haberdashery were not nearly so interesting as cutting tools, lathes, milling machines, and so on. Could it be that this community's most illustrious citizen, unemployed at the moment except for the chore of writing memoirs, is planning to associate himself with the metalworking field?

Moral of this story: When returning Reader Service cards to us, Please Sign Your Name and give your Company Affiliation.

While the Supply Lasts

A notice several months ago in this column to the effect that we had a limited supply of reprinted articles in our files brought a flood of requests. The supply is just about gone. However, for those who still might be interested, the following are still available in the amount beside the

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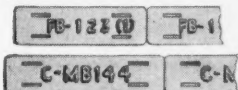
Definitions

What's the definition of an economist? Not what a lot of people think, according to the staff of the Chamber of Commerce of the United States. One kind of economist can think up ways to SAVE money. Another kind, with just as many college degrees, thinks up ways to SPEND money. So the big difference between a government economist and a government economist is the emphasis on MISER.

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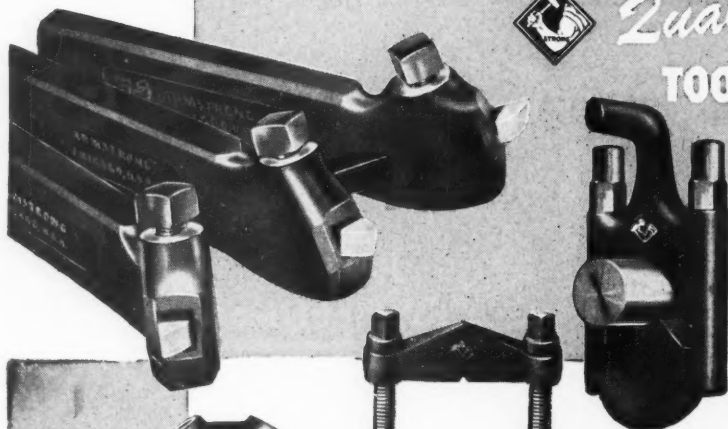
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features
in this issue

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APRIL, 1953

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Diversifying the Use of the Taper Pin, Part I

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Electrical Contacts Align Weld Jig

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This article describes cam action dies in use at Northrop Aircraft, Inc., to produce flanged and beaded stainless steel end rings which are used to join airplane hot air ducts together. Page 154.

How to Increase Production with Portable Tools

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Band Filing Economy Extends Beyond High Production

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The author stresses the efficiency of the band method in the filing of various shapes and types of materials. Page 174.

Photography Can Help You Solve Some Shop Problems

By H. G. Frommer

In this article the author explains the various uses, other than advertising, for the camera within the average plant and he gives all instructions required for a layman to do a good industrial photography job. Page 186.

The Foreman and the Lady

By Martin Schaul

A discussion of misunderstandings encountered in handling women workers and how to cope with them. Page 208.

Mass-Producing Low-Cost Blanking Dies

By R. C. BEAVER*

In which the author describes the method of constructing the pierce blank template.

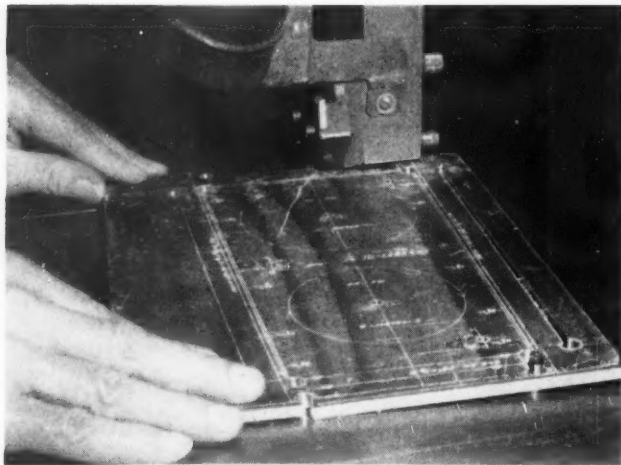
STANDARD high-speed repetitive production machines are designed and built to cope with average mass production conditions. However, when production conditions deviate from the average, these standard machines may, in many instances, require some modification in design, operation or tooling to compensate for this deviation. Such deviations from standard

mass production conditions are a constant problem in the aircraft industry.

Two common deviations in the aircraft work which are constantly at odds with mass production principles are (1) relatively short runs of any one part, and (2) engineering changes which are constantly floating through the shop, and which interrupt the normal course of production. Taken together, these two deviations often nullify the main advantage of standard

high-speed production machines—that of constant repetitive production of the same part for weeks or months after the initial set-up has been made.

These same factors—short-run production



▲
Sawing the PBT punch from ordinary plow steel. Note photo outline photographed on punch material.

* Mechanical Design Engineer, Plant Engineering Department, El Segundo Division, Douglas Aircraft Company.

Sawing the Kirksite die. Two outlines are scribed on this sheet — one conforming to punch size, the other $\frac{3}{64}$ inch inside the punch outline. Sawing is along inside line, and at a 25-30 degree closed bevel. Excess material is broached from the die during mating of the die halves in the punch press.



and engineering changes — may also strongly influence the cost of tooling a standard production machine. When a great number of die sets are required to tool a single airplane (to cope with the short-run production of many different parts), and when these dies must be constantly altered and reworked to comply with engineering changes, costs may mount until another method of accomplishing the work becomes imperative, or cheaper tooling is devised.

This was the situation faced by the punch press during the early days of the aircraft industry. For a long time it seemed quite certain that routers would have to be used to turn out production blanks for subsequent piercing and forming. The cost of multiple conventional die sets for the punch press, the fact that each die set would be used to produce only a relatively few parts, and the danger that engineering changes would further curtail the already limited use of the die sets, was a cost problem that threatened to nullify other obvious advantages of the punch press in aircraft work.

The one angle in this situation that seemed to offer a possible "out" was to design and use cheaper punch press dies. Such dies would have to be made from less costly material, would have to be easy to produce in great numbers, must modify easily to cope with engineering changes, but would still have to deliver the precision required in all aircraft work. These dies would have to replace the conventional dies for piercing and blanking the thousands of light-gauge parts used in each of the airplane models produced.

Comprehensive studies along this line eventually lead to the development of the pierce blank template, or PBT as it is commonly referred to in aircraft circles. The PBT is essentially a low-cost Class B blanking die mounted on $\frac{1}{4}$ -inch hot rolled steel backing plates. Ordinary plow steel is used for the punch; Kirksite is used instead of steel for the die material. Rubber strippers glued to the back plate are used for expelling the blank

from the die. Piercing punches are designed with a knurled base for installation in the relatively thin $\frac{1}{4}$ -inch backing plate material. The die and punch sections are secured to their respective backing plates with 5/32-inch steel rivets. Due to the soft Kirksite material used in the die, the punch is used to broach the die to size after both have been mounted and centered on their backing plates. This results in considerable time-saving over the older method of filing during final matching of punch and die.

The overall simplicity and ease of construction of the PBT lends itself ready to assembly line methods of die production. We employ this assembly line technique at Douglas to turn out the hundreds of PBT die sets required. In producing conventional die steel dies, one individual is usually responsible for complete fabrication of the tool. When a PBT is produced by as-

sembly line methods, each individual is responsible for only one phase of die construction. This curtails the amount of tooling experience required and reduces costs accordingly.

As the punch is normally the nucleus of most blanking dies, PBT construction starts with this part. The plow steel punch material is received from the photographic laboratory with the image of the punch photographed on the surface. As this image is photographed from a master layout including several overlapping parts, identification of the correct outline is the first step. The layout man then locates and drills all punch holes to the proper size.

After layout, the punch is then sawed to the photo outline and sent to the filing group. Here a $1\frac{1}{2}$ degree closed bevel is filed or ground to provide necessary punch clearance. During this operation, the punch is checked

frequently against a photo duplicate to insure accuracy. This photo duplicate is on thin gauge sheet stock and is furnished with the punch.

After beveling, the punch is ready for mounting. The $\frac{1}{4}$ -inch hot rolled backing sheets for both punch and die serve the same purpose as the stand-



Squeeze-riveting the Kirksite die to its steel backing plate. Steel or monel flush-head rivets are used.

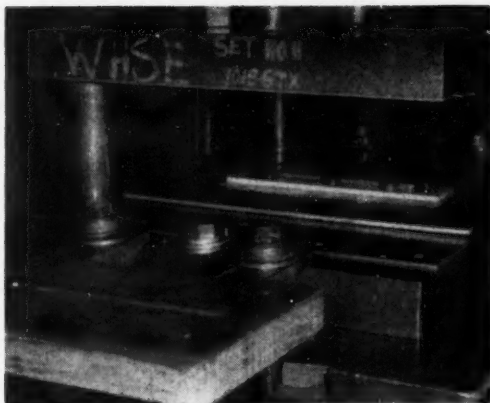
PBT mounted in punch press.

ard die set for a class B die, and provide a means for attaching the PBT to the punch press. The first step in mounting is to select two backing plates of suitable size and position them for jiggging. Index holes are then drilled, along with attaching holes for locating and holding the punch and die to the die shoe. Drill jigs with mastered hole patterns are used for this drilling. These hole patterns coordinate with identical hole patterns in the punch presses.

With the backing plates still jiggged, a sheet of $\frac{1}{4}$ -inch Kirksite approximately 3 inches larger in all dimensions than the punch is placed on top. The punch itself is then superimposed on the Kirksite, and three $\frac{1}{4}$ -inch holes are drilled through all four plates to serve as coordinating holes for subsequent operations. While the plates are still in this position, the outline of the punch is scribed on the surface of the Kirksite. The punch is then removed and a second line is scribed on the Kirksite $\frac{3}{64}$ -inch inside the line scribed from the punch.

The Kirksite sheet is then removed and sawed to a 30 degree closed bevel along the inside line. This $\frac{3}{64}$ -inch excess material is subsequently broached off by the steel punch when the die and punch are mated.

The next step is to attach both die and punch to their respective backing plates. The coordinating holes are



used to index the position of the die and punch while attachment rivet holes are drilled. After drilling, the rivet holes are countersunk on both sides; $\frac{5}{32}$ -inch flush-head steel rivets are used and set with a pneumatic rivet squeeze. The set from each rivet must fill the countersunk area. After riveting, the top and bottom sides of both die and punch are ground to assure surface smoothness. After grinding, the piercing holes in the punch are drilled full size and completely through the backing plate. This provides clearance for subsequently punched slugs.

The next step is broaching. The two halves of the PBT are placed in the punch press with the punch at the bottom and the die at the top. The press is then lowered, forcing the punch into the die and shearing off the $\frac{3}{64}$ -inch excess Kirksite material. The zero fit thus obtained, coupled with the flow properties of Kirksite under press pressure, provide a self-sharpening action during the life of the PBT.

The PBT is then removed from the

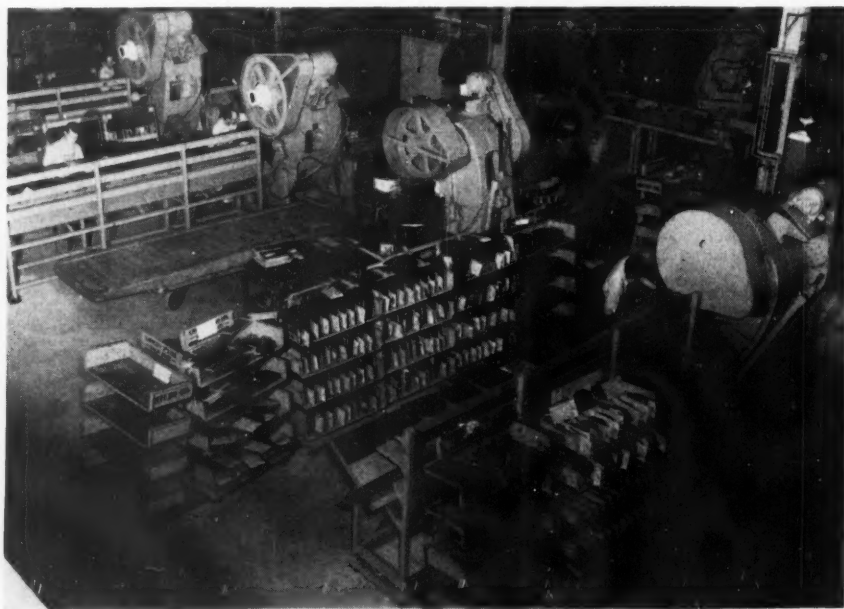
punch press while still in mated position, and the piercing holes in the punch are back-drilled into the die backing plate. The die and punch are then separated and the excess material that was broached from the die is removed. The knurled-base piercing pins are then driven into the die backing plate, and the rubber strippers (approx. Shore 40 in hardness) are glued on the backing plate around the inside of the die cavity and around the perimeter of the punch. The punch is then turned over and all piercing holes are given extra relief for slug clearance. The PBT is now ready for use.

The size of part that can be blanked with a PBT is subject only to the limitations of press size. At the Douglas

El Segundo plant, PBT's measuring 48 inches by 88 inches are in use on a 245-ton Minster press. Another PBT, 54 inches by 143 inches in size will be run on a 600 ton hydraulic press. Development work may indicate, however, that a heavier backing plate, ranging upward to $\frac{1}{2}$ inch in thickness, may be required for these excessively large dies.

PBT's are of relatively light construction, and are therefore limited in use to the blanking of such materials as aluminum, magnesium, plastic and phenolic sheet, and so on. Material gauges should not run heavier than approximately 0.072 inch, otherwise spreading of the die may occur and create a clearance conducive to burr-

These racks of PBT's in the Douglas punch press department indicate the number of times that punch press dies are changed each day. These are all PBT sets, along with production order and raw material awaiting production punching. One hundred blanks is a large run; more production runs vary downward to 50, 25, or even a dozen blanks.



Here is a completed PBT (left), the pierced blanks produced with it (center), and the left-over scrap.

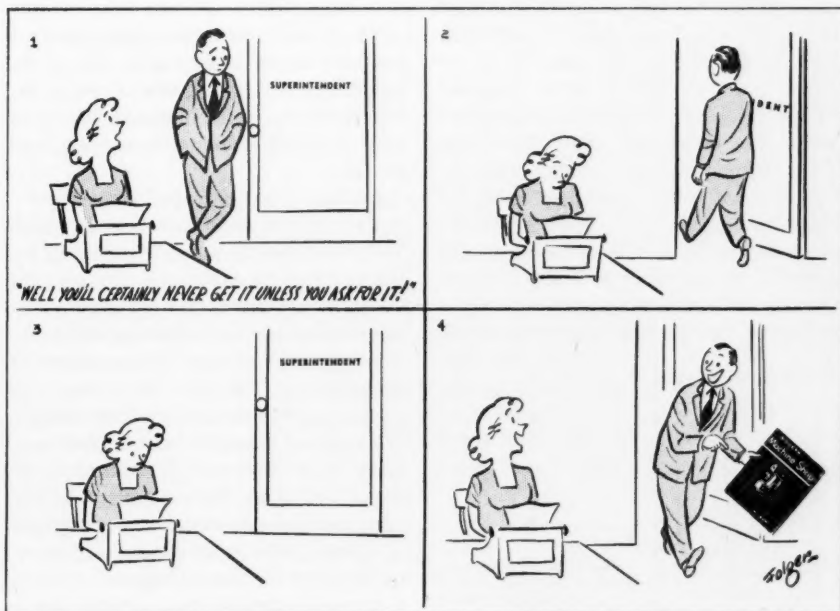


ing. The plow steel punch may become dull when used on materials harder than 75 ST aluminum.

Despite these limitations, the PBT has proved a great time and cost saver in light-gauge metal blanking and piercing work. With its limitations properly considered, and especially when short-runs of any specific part are indicated, it seems that the same advantages could be reaped by non-

aircraft industries. However to date, this low-cost class B blanking die has served mostly in the aircraft industry, and is little known or used outside aircraft circles.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.



Diversifying the Use of the Taper Pin, Part I

By FRED ROGERS

A comprehensive two-part article on the various uses of the taper pin with hints of value both to the engineer and the man in the shop.

A MANUFACTURING executive, who had come up from the ranks once said, "Whenever I see the large and small ends of a taper pin flush with the surface of a piece, I get a feeling of insecurity. I ask for a hammer and a brass punch and give the large end of the pin a whack and send the pin home. Invariably I can sink the pin down an additional $\frac{1}{16}$ in. or more. It is a mistake for a designer to specify a taper pin in an assembly where the large end should be flush. This might look neat and shipshape, but you are at the mercy of incompetence on the part of the workman. Now suppose that the hole is reamed only 0.001 in. larger than it is supposed to be; the pin will drop into the hole nearly .050 in. farther because of the slight

taper in the pin.

A $\frac{1}{4}$ in. taper per foot is equivalent to an included angle of 1 deg.-

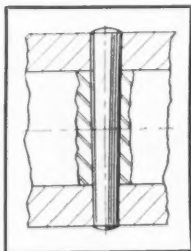


Fig. 1—Drawing showing taper pin in position flush at each end.

12 ft. The ratio of taper to 1 in. of length is as 1 is to 48. Yes sir, I want my taper pins to protrude, then I have a sense of security for I know that the pin has been driven home. Then the sticking taper will do its work."

A taper of $\frac{1}{4}$ in. per foot is only 0.028 in. per inch. Carrying this further the taper is 0.0104 in. in $\frac{1}{2}$ in., 0.0052 in. in $\frac{1}{4}$ in., 0.0026 in. in $\frac{1}{8}$ in., 0.0013 in. in $\frac{1}{16}$ in. and 0.00065 in. in $\frac{1}{32}$ in. on the diameter and not just per side.

In Fig. 1 is illustrated what the executive had in mind and against which he complained. It seems customary for the designer to show pins this way for it will be evident to many readers that they have seen one drawing after another with taper pins shown flush at each end of the pin. In a way this seems justifiable because the length of standard pins are in increments of $\frac{1}{8}$ in. from $\frac{3}{8}$ in. to 1 in. and by $\frac{1}{4}$ in. from 1 to 6 in. This means that the designer can determine the diameters of bosses, collars, bushings, and so on, in logical dimensional sizes.

Figure 2 shows the way the execu-

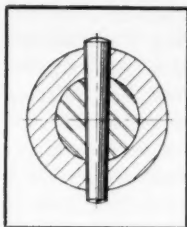


Fig. 2 — Drawing showing taper pin in position protruding equal amounts at each end.

tive suggested is the proper meth-

od of portraying and assembling taper pins. The pin protrudes top and bottom an amount equal to approximately $\frac{1}{16}$ in. along the tapered portion. This is exclusive of the crown or radiused end of the pin. If a standard length of 3 in. is used, for example, in a number 6 pin, the diameter of the piece would be $2\frac{7}{8}$ in. if the pin were to protrude $\frac{1}{16}$ in. each end. If cast iron is the material used outside the shaft, the designer can readily control the size. If, however, cold drawn steel is required, then a size of 3 in. diameter would have been more convenient to use. This is further aggravated if the methods or time study man frowns on an extra turning operation to properly accommodate the standard length of a taper pin.

Several designers have been approached by the writer to get their reaction to the two methods of assembly in Fig. 1 and 2. The suggestion was made to adhere to standard length of pins and let the pin protrude $\frac{1}{8}$ in. at each end. In this way, in the example of a number 6 by 3 in. long pin, the diameter of the outer piece would become $2\frac{3}{4}$ in. An opinion was advanced that such a long protrusion would create a hazard or in close quarters it would be a point of interference.

Another suggestion was made to eliminate both methods in Figs. 1 and 2 and adopt the method shown in Fig.

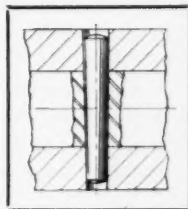
3. Here the pin has no protrusion, thereby eliminating a hazard. And if the afore-mentioned executive should stroll along, let him "whack" the pin in another $\frac{1}{16}$ in. if he so desired, then the pin would just peek through the hole. It would be interesting indeed to know which way the reader leans. He might even have another method which contains plenty of merit.

In any event, the taper pin, either standard or modified, has many uses. This article proposes to discuss the efficiency of its use, show some little publicized uses, advance numerous kinks, incorporate a hitherto unpublished table of pin sizes, and to compare our American standards with that of the British and German systems.

There is an axiom pertaining to the use of tapered pins, that being "Always provide for the removal of a taper pin." In the use of standard pins assembled as in Figs. 1, 2 and 3, a hammer and brass rod are all that would be necessary for disassembling purposes. However, when the pin is used in a blind hole, other means must be resorted to, to "crack loose" the pin from its socket. In Fig. 4, the upper end of the pin is milled square to accommodate a wrench. Ordinarily, standard taper pins can be purchased soft or heat treated. When a wrench is to be applied with some regularity, the head should be hardened to prevent chewing up the corners. A



Fig. 3 — Drawing showing taper pin in position recessed equal amounts at each end.



hardened pin would have to be ground square or a soft, square-milled pin should be case-carburized at least at the square end.

Because squaring the head somewhat weakens the pin, (for it has been known that the wrench head has been twisted off), the method of squaring in Fig. 5 has been used. Whereas the

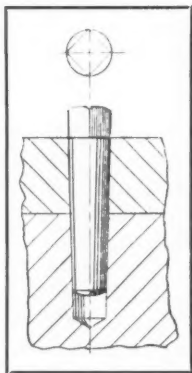


Fig. 4 — Drawing of taper pin having one end milled square to accommodate wrench.

distance across flats in Fig. 4, reduces the diameter nearly 30 percent, a somewhat larger square results in Fig. 5. However, the width of flat is reduced thereby making the possibility of wrench slippage greater as the corners are already rounded. These corners, however, have considerably greater resist-

ance to chewing-up than the perfectly squared example in Fig. 4.

The method for removal shown in Fig. 6 is effective for the smaller sized pins. Not much material is removed and the flats are reasonably long. Pliers should never be used in removing taper pins with squared or wrench heads. Especially in the latter design, a close fitting end wrench or better still a monkey wrench adjusted to a snug fit is better to turn the pin loose.

A very special, but highly efficient design of removable taper pin is shown in Fig. 7. In this instance a through-hardening high carbon steel is used and the body ground to size. The

squared end is the next nearest "rounded" fraction larger than the standard large diameter of the pin. Square stock properly centered can be used with no finish on the square sides of the head. Mild steel has been used and the whole pin case carburized but with the body remaining as turned, that is not ground.

Sometimes it is objectionable for the squared or flattened head of the pin to protrude. In Fig. 8, the head rests in a cast-in or counterbored recess. In this instance it is necessary to employ a socket wrench to loosen the pin. However, a neat appearing assembly results by recessing the head.

When the pin is required to extend through large section pieces, the methods in Figs. 9 and 10 have been used. In Fig. 9 a comparatively short length pin is used where the head extends upwards into a counterbored hole of considerable depth. The diameter of counterbore must be large enough to accommodate the head of a socket wrench. In Fig. 10, the counterbored portion of the hole is just large enough so as not to bind on the upper body of the pin. This extension fills the hole so that there is less likelihood for dirt or chips to clog and interfere with the wrench head. In a similar installation the squared head did not protrude, as shown in the sketch, but a second counterbore had to be used to accommodate the wrench head.

Positive Pin Retention

Morse and Brown & Sharpe tapers, some of which are now known as American Standard Association tapers, have approximately $\frac{5}{16}$ in. and $\frac{1}{2}$ in. tapers per foot respectively. The whole range of Jarno tapers has a taper

per foot of .600 in. These tapers are considered "sticking" or self-holding tapers whereby they are not supposed to become loosened when driven home in their respective sockets. However, to guard against loosening through shock or twisting action, the small end of the taper is tapped out to accommodate a drawback rod. This is, of course, a safety factor to prevent possible damage to machine or injury to worker.

Similarly, the designer sometimes provides a safety feature in his taper



Fig. 5 — Drawing illustrating method of squaring end of taper pin to provide maximum width across flats.

pin assemblies to make positive that the pin will not work loose especially in vital and hard-to-get-at locations. The small end of the pin may protrude sufficiently to expose a previously drilled hole large enough to accommodate a cotter pin or a small piece of bent wire. The large end of the pin may be staked in or the edge of the hole peened over enough to form an obstruction to prevent the pin from lifting in the hole.

A more positive way is to provide a thread at the small end on which a nut is screwed at assembly together with a lock washer. Sometimes a hole is drilled as in Fig. 11 for a cotter pin which engages a slotted or castellated nut. To keep this protruding part as short as possible one design that was

Fig. 6—Drawing showing design of flats recommended for small size taper pins.



observed had a soft check nut drilled with three cross holes, that is an opening in each flat one of which eventually lined up with the hole in the taper pin for the cotter pin. One manufacturer makes specially designed taper pins with thread ends with drilled hole for cotter pin or without drilled hole. These are used in aircraft construction in place of commercial taper pins. They are made of nickel steel for strength and are heat treated. They are centerless ground after hardening for accuracy and uniformity and cadmium plated.

Another means of pin retention is illustrated in Fig. 12. Whereas all the applications previously shown were either standard or modified standard taper pins with the exception of Figs. 7 and 10, the method used in Fig. 12 is also of special nature. The large end is a hollow head set screw, made integral with the pin. A customary hex wrench which comes with these set screws is used to force the pin in tightly and conversely, to withdraw the pin. This type of taper pin is usually heat treated especially at the wrench opening.

Spring snap rings are sometimes used to retain

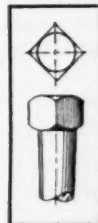


Fig. 7—Drawing showing design of highly efficient removable taper pins.

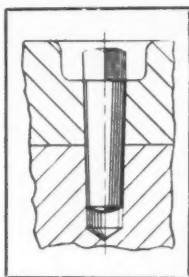


Fig. 8—Design of taper pin applicable to cast-in or counter-bored recesses.

taper pins if they should accidentally become loose in the hole during

operation of the mechanism into which they are assembled. In Fig. 13 a shallow groove is turned in the hub of the retained member. In the illustration, the ring is shown purposely wide to show the design more clearly. However, this ring has a maximum width equal to the large diameter of the pin and may be considerably narrower if desired. The ring thickness which is kept to a minimum, depends on the diameter of the hub. While the joining ends of the split ring are shown cut on a bias, a straight cut is equally good, as long as in the assembled position they do not spread wider than the small diameter of the pin. Round wire snap rings are sometimes used to keep taper pins in place, fitting into a groove equal to or deeper than the diameter of the wire used. It will be found that in the method shown, the flat form is more easily manipulated when removing. The flat type also presents a neat, flush appearance. The British have a very simple means of pin retention which will be dealt with later in this article.

Removal by Jacking

When a taper pin is assembled into a blind hole, as previously illustrated in Figs. 4, 8 and 9, means must be provided for its removal. Whereas, in

these examples, a squared head or flat was milled at the large end of the pin, other arrangements are possible and used to some extent. Such designs are shown in Figs. 14 and 15. In Fig. 14, a number 8 standard pin is threaded to $\frac{1}{2}$ -13 or $\frac{1}{2}$ -20. This size pin is .492 in. at the large end and while the screw portion is a trifle undersize, sufficient depth of thread remains to accommodate a hex nut. The pin is driven in as a normal pin. When it must be withdrawn, the nut is turned in a clockwise direction to crack the pin loose from its socket. In Fig. 14, the pin retains a heavy sleeve. Even though the hole for the pin were drilled through the sleeve into the shaft bore, it would be difficult to drive the pin out.

In Fig. 15, a larger taper pin is used to align a heavy saddle with the bed. Instead of disassembling by means of a crane in which the dowels are removed integrally with the saddle, the tapered dowels are removed first and the saddle slid off the bed. To assemble, the saddle is slid into approximate position, within approximately $\frac{1}{32}$ in. of hole alignment. The pin, having a well rounded end at the small diameter enters the hole in the bed. As the pin is of heavy cross section it aligns

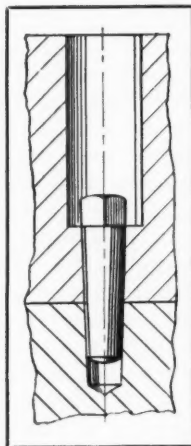


Fig. 9—Design of comparatively short length pin for application in counter-bored hole of considerable length.

the saddle correctly as the pin is driven home. The upper end of the pin is threaded smaller than the body. The end is dog-pointed well below the root diameter of the thread to prevent mushrooming and thereby interfering with the proper functioning of the nut. The nut operates the same as in Fig. 14, but is not shown in the drawing.

One of the short-comings of this type of taper pin removal is that the hex nut offers a wrench-happy mechanic the opportunity of inadvertently loosening the pin. During assembly the nut can be screwed on by hand only and acts more like a thread guard than a conventional hex nut. However, in Fig. 15, this disadvantage is somewhat overcome. Any purchaser or user of threaded parts that are shipped into his plant has noticed the cardboard collar surrounding exposed male threads. This protects the thread from damage during shipment.

In Fig. 15, the same idea is used, although it must, of necessity, be a bit more substantial.

A piece of tubing or pipe can be threaded internally to act as a guard. In the illustration, the protector is made of steel, the tapped hole is blind,

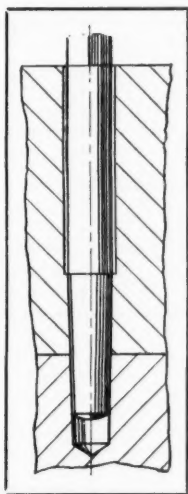


Fig. 10 — Drawing showing design of taper pin for application in counterbored hole of such size that will not bind upper body of pin.

Fig. 11 — Drawing of taper pin which is threaded at one end and drilled to receive cotter pin.



and the outside is knurled. A cast iron cap, with outer surface as cast and painted affords sufficient roughness to be screwed on by hand.

While the threaded end in Fig. 15 is of smaller diameter than the pin, some sizes, as mentioned in Fig. 14, can be threaded directly. A number 2 pin is .193 in. at the large end and can be threaded $\frac{1}{8}$ or number 10-24 or 32 thread. A number 4 pin is .250 in. and can be threaded $\frac{1}{4}$ -20 or $\frac{1}{4}$ -28 as desired. While the helix angle of a National fine thread is smaller than that of a National coarse thread, the latter has been found to perform adequately.

The American System

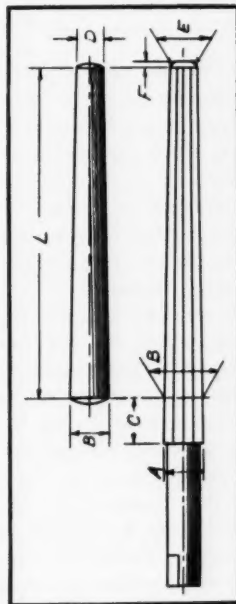
The American system, as standardized by the American Standards Association, has 17 diameters in 107 lengths that can be used with standard reamers. These sizes are shown within the heavy lines in Table 1, Page 138-139. An explanation of this table is made at this time as various references are made to it during and after the comparisons with the other systems. Hitherto, such a complete table has not been published. All the data pertaining to taper pins and reamers required by the shop man and the engineer are contained therein. It would be to the reader's advantage to clip these pages and

Table I

No. of Taper Pin	7/0	6/0	5/0	4/0	3/0	2/0	0	1	2	3	4	5	6	7	8	9	10	Effective length l
Large Dia. of Pin B	.0625	.0780	.0940	.1090	.1250	.1410	.1560	.1720	.1930	.2190	.2500	.2890	.3410	.4090	.4920	.5910	.7060	
Large Dia. of Reamer A	.0666	.0806	.0966	.1142	.1302	.1462	.1638	.1798	.2008	.2294	.2604	.2994	.3540	.4220	.5050	.6066	.7216	
Small Dia. of Reamer E	.0497	.0611	.0719	.0869	.1029	.1137	.1287	.1447	.1605	.1813	.2071	.2409	.2773	.3297	.3971	.4805	.5799	
End of pin to end of Flute C	3/16	1/6	1/6	1/4	1/4	1/4	3/6	3/6	3/6	1/2	1/2	1/2	5/6	5/6	5/6	3/4	3/4	Effective length l
3/6	.0547 3/64	.0702 1/16	.0862 5/64	.1012 3/32	.1172 7/64	.1332 1/8	.1482 9/64	.1642 5/32	.1852 11/64	.2112 13/64	.2422 15/64	.2812 9/32	.3332 21/64	.4012 25/64	.4842 31/64	.5832 37/64	.6982 11/16	3/6
1/2	.0521 3/64	.0676 1/16	.0836 5/64	.0986 3/32	.1146 7/64	.1306 1/8	.1456 9/64	.1616 5/32	.1826 11/64	.2086 13/64	.2396 15/64	.2786 17/64	.3306 21/64	.3986 25/64	.4816 15/32	.5806 37/64	.6956 11/16	1/2
5/6	.0495 3/64	.0650 1/16	.0810 5/64	.0960 3/32	.1120 7/64	.1280 1/8	.1430 9/64	.1590 5/32	.1800 11/64	.2060 13/64	.2370 15/64	.2760 17/64	.3280 21/64	.3960 25/64	.4790 15/32	.5780 37/64	.6930 11/16	5/6
3/4	.0624 3/64	.0784 1/16	.0944 5/64	.1094 3/32	.1254 7/64	.1414 1/8	.1564 9/64	.1724 5/32	.1974 11/64	.2034 13/64	.2344 15/64	.2734 17/64	.3254 21/64	.3934 25/64	.4764 15/32	.5754 37/64	.6904 11/16	3/4
7/6	.0758 1/16	.0908 5/64	.1068 3/32	.1228 7/64	.1378 1/8	.1528 9/64	.1678 5/32	.1828 11/64	.2038 13/64	.2318 15/64	.2608 17/64	.2908 21/64	.3228 25/64	.3908 15/32	.4738 37/64	.5728 9/16	.6878 11/16	7/6
1	.0732 1/16	.0882 5/64	.1042 3/32	.1202 7/64	.1352 1/8	.1512 9/64	.1672 5/32	.1822 11/64	.2022 13/64	.2292 15/64	.2682 17/64	.3202 21/64	.3882 25/64	.4712 15/32	.5702 37/64	.6852 9/16	.8152 11/16	1
1 1/4	.1150 7/64	.1300 1/8	.1450 5/64	.1600 3/32	.1750 7/64	.1900 1/8	.2050 9/64	.2200 5/32	.2400 11/64	.2600 13/64	.2800 15/64	.3000 17/64	.3200 21/64	.3400 25/64	.3600 15/32	.3800 37/64	.4000 9/16	1 1/4
1 1/2	.1248 7/64	.1408 1/8	.1568 5/64	.1728 3/32	.1888 7/64	.2048 1/8	.2208 9/64	.2368 5/32	.2528 11/64	.2688 13/64	.2848 15/64	.3008 17/64	.3168 21/64	.3328 25/64	.3488 15/32	.3648 37/64	.3808 9/16	1 1/2
1 3/4	.1356 1/8	.1516 5/64	.1676 3/32	.1836 7/64	.1996 1/8	.2156 9/64	.2316 5/32	.2476 11/64	.2636 13/64	.2796 15/64	.2956 17/64	.3116 21/64	.3276 25/64	.3436 15/32	.3596 37/64	.3756 9/16	.3916 11/16	1 3/4
2	.1304 1/8	.1464 5/64	.1624 3/32	.1784 7/64	.1944 1/8	.2104 9/64	.2264 5/32	.2424 11/64	.2584 13/64	.2744 15/64	.2904 17/64	.3064 21/64	.3224 25/64	.3384 15/32	.3544 37/64	.3704 9/16	.3864 11/16	2

Effective Length L	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4	4 1/2	4 3/4	5	5 1/4	5 1/2	5 3/4	6
			</													

Fig. 16—Drawing illustrating standard taper pin and standard reamer. Letters indicate relationship of the pin with the reamer.



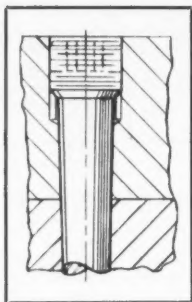


Fig. 12—Large end of taper pin illustrated here is hollow head set screw.

file them away with other valuable data as it will save time and effort when future calculations must be made.

The top row of figures are the pin numbers. Directly below are given the large diameters of the pins. The next two rows are the large and small diameters of the reamers respectively. Then follows the length of reamer flute that extends beyond the large diameter of the pin. These various figures are represented in Fig. 16 which also shows the relationship of the pin with the reamer. In our American system the end of the reamer **E** and the small diameter **D** of the pin vary in sizes No. 0 through 10 by an average of .0013 in. so that the length of chamfer **F** therefore is $\frac{1}{16}$ in. The longest length of pin (in any size) is shown so that diameters **B** on both pin and reamer coincide. Length **C** can then be found by the equation **A** minus **B** divided by .0013 which will give the number of sixteenths of an inch that the flutes

extend beyond the large end of the pin. These values are given in the

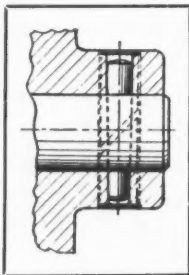


Fig. 13—Drawing showing design of taper pin on which spring snap ring is used.

fifth line of figures in the table.

In the right and left hand vertical columns are listed the effective lengths of all sizes of pins. In the main body of the table are shown the diameters of the small ends of the pins for their respective lengths, beside which are given the fractional diameter of the drill used to the nearest $\frac{1}{64}$ in. below.

The diameters shown below the lower heavy line are for lengths of pins not used with standard reamers. To

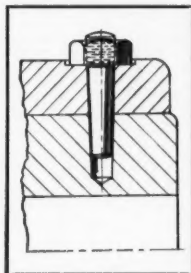


Fig. 14—Drawing showing design of taper pin having threaded end to accommodate hex nut.

use such lengths the reamers would have to be ground down or to paraphrase, these longer lengths can be used only after one or more sharpenings of the reamer take place.

Short Taper Pins

To the writer's knowledge, the diameters for shorter length of taper pins above the upper heavy line have never been published. They will be found exceedingly helpful in the use of shortened pins and reamers for examples shown in Figs. 17 through 22 which will be explained later.

As stated previously, the diameters above the upper heavy line in Table 1 are for short taper pins. These values are not shown in handbook tables or in material published by the American

Standards Association. It has been the writer's experience as well as other engineers contacted, that taper pins of abbreviated lengths are used more than is ordinarily supposed. Pins from No. 4 to No. 10 are referred to especially. The lengths range from once the diameter for the large diameter pins to once and a half the diameter for the smaller sizes down to No. 4 pin.

The pin key illustrated in Fig. 17 is a good example of the use of a shorten-

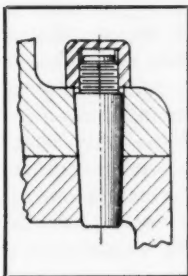


Fig. 15 — Drawing showing design of taper pin having threaded end with smaller diameter than body. Cap nut provides means for pin removal and serves to protect threads.

ed taper pin. In one design, the pin secured a bronze liner in a boss and at the same time guided a cylindrically shaped plunger into which a keyway had been cut. The plunger was of such a diameter that it could not accommodate its own key and the liner bushing wall was too thin to have a keyway cut in it. The key end can be cyanided to provide for a light skin hardness. This type of pin key has also been case-carburized all over and the key side faces lapped to a good sliding fit.

Cross drilled holes in lubricating and hydraulic installations, in many instances, must be drilled from the outside surfaces. This holds true whether they are in an angular position or perpendicular to each other. To make these drilled passages for conveying

Fig. 17 — Drawing showing a pin key design which is applicable to shortened taper pins.



oil to proper locations function,

some holes must be plugged shut. Several methods of closing off these holes are available, some more costly than others. After the holes are drilled, a straight reamer can be inserted and the hole sized for a short length to accommodate a straight steel or brass pin plug. This must be a tight fit so the pin will not vibrate loose.

Another method is to drill 21/64 or 11/32 holes and tap for 1/8 in. pipe plugs. This latter method requires a white or red lead dope to be smeared on the thread to make it oil tight. In some manufacturing establishments, the comparatively recent Dryseal pipe thread has been adopted which requires no sealer around the threads. However, this method of plugging holes is expensive and not always necessary. It is understood, of course, that larger size drills and taps also can be used.

In Fig. 18 is shown a very short taper pin plug the length L of which is equal to the large diameter D . The reaming operation is the same as for a straight pin but the fitting tolerance does not require the accuracy as for

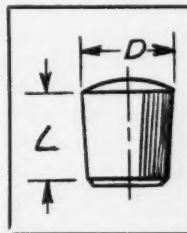


Fig. 18 — Drawing showing design of short taper pin plug.

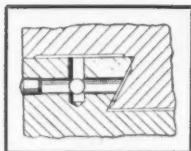


Fig. 19 — Drawing showing a pin assembled in a cross-drilled hole designed for lubricating a dovetail arrangement.

a straight pin plug. As the taper per foot is $\frac{1}{4}$ in., or about .021 in. per inch, a taper pin plug $\frac{1}{2}$ in. long will vary from large to small diameter by .010 inch. A pin $\frac{1}{4}$ in. long has a .005 in. taper in it. These short pins can be driven home with assurance of permanent tightness.

Fig. 19 shows a pin assembled in a cross-drilled hole for lubricating a dovetail arrangement. As mentioned previously, this type of pin plug can be used extensively in hydraulic valves, cylinders, pumps and other contrivances wherever cross drilled holes must be plugged shut.

Because taper and straight pins are pressed in for permanency, their use is not as advantageous as a pipe plug if they must be removed during the life of the piece in which they are used. They must, of course, be drilled out, but in most instances it is highly unlikely that such will be the case.

In Fig. 20 is shown the application of another short taper pin. In this example, it was used as a foot or rest for a small drill jig. The jig body was of such proportion that a long taper pin could not be used. The fact that a tapered pin was used in preference to another type of pin was that it provided a permanent assembly in that the pins would not have to be removed or replaced and secondly that the taper would afford a tight fit on the pin once driven home. The small round flat A was surface ground simultaneously on the four pins after the jig

was completed and the pins assembled. The remainder of the rounded end acted as a satisfactory chamfer for the bearing surface.

Figure 21 illustrates another example using a short taper pin portion. This is a removable stop placed in several positions in the mechanism in which it is used. The lower end is held to a decimal dimension and is the stop part of the pin. The taper is equivalent to a No. 10, or .706 in. at the large diameter and $\frac{3}{4}$ in. in length. The knob is coarse knurled and because of the duty imposed is made heavy both in diameter and in length. The finger tips are not used for removal but rather it is gripped between the thumb and forefinger whereby they encircle the entire head. A ratio between the taper diameter and the head diameter is approximately 1 to 3 so that there is enough leverage to break the taper loose. To obtain a snug fit in the socket, only a slight wringing action is necessary. The straight and tapered portions are hardened and ground.

The last example of a shortened taper pin is the pin key in Fig. 22. This differs somewhat from the key shown in Fig. 17 in that the key end is round instead of being flattened. This is also a No. 10 pin, the upper end being relieved in diameter to avoid mushrooming. Because it requires occasional removal, the large end is tapped out to accommodate a jacking out screw. In this

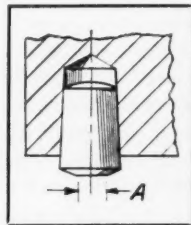


Fig. 20 — Design of short taper pin applicable as a foot or rest for a small drill jig.

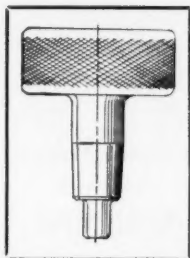


Fig. 21 — Design of short taper pin for application as a removable stop.

in this instance the pin was inserted through a $\frac{7}{8}$ in. diameter counter-

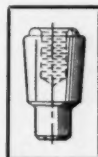
bored hole approximately 2 in. deep. For removal, a $\frac{1}{8}$ in. hex head screw with a washer under the head was used for jacking purposes.

In the use of short taper pins, the large diameter of the pin is maintained as standard. In other words, the pin is cut off at the small end, the latter being discarded. While this is not absolutely necessary, because any part of the pin can be used, nevertheless the value of one diameter, namely the large diameter, is always known when the former practice is followed. The reader will be quick to point out apparent disadvantages of having to mu-

tilate a taper reamer by cutting off most of the flute length. This would be so if a new reamer were to be used, but it will be found that undersized reamers from a larger size can be used instead. Also reamers with broken off ends have been salvaged. Of course, a short reamer is only necessary where a short blind hole is required. In many instances, a standard length reamer can be used where a through-hole is available or where considerable end clearance is available.

In Part II, the British and German system of taper pins will

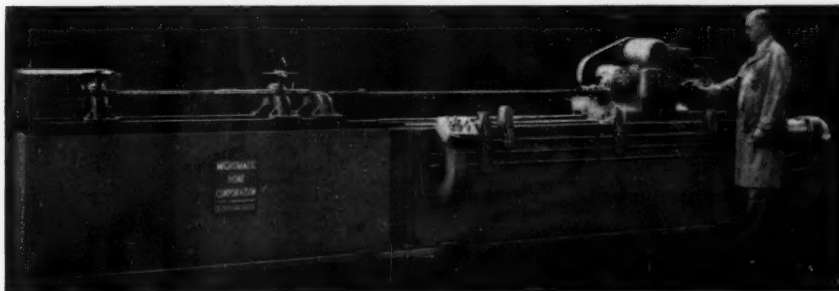
Fig. 22 — Drawing showing example of shortened taper pin having round key end.



be discussed and compared to our own American standard. This will be accompanied with some two dozen other unusual applications of the common taper pin.

Automatic Gun Barrel Honing Machine

MANUFACTURED by the Micromatic Hone Corp., Detroit, Mich., the Model 606 Horizontal Hydrohoner illustrated herewith is designed to Microhone gun barrels up to 4 inches in diameter within tenths of a thousandth of an inch tolerances in a completely automatic operation. This machine, equipped with automatic feed and sizing controls, is used to hone 20 mm. and 60 caliber gun barrels.



Electrical Contacts

Align Weld Jig By GEORGE MORTON

In which the author describes how a critical tube welding alignment problem was solved by using an electrical "saddle-equipped" jig.

A WELDING job that should be of great interest to precision tooling engineers was completed recently in the shops at Airline Welding & Engineering Company, Hawthorne, California. Basically, the job consisted of

welding four lengths of Type 321 stainless steel tubing into a single tube 42 feet long. Complications were introduced by the fact that each tube section was predrawn to varying wall thicknesses (0.025 to 0.062 inch) and

Fig. 1—This diminishing perspective view shows the length of the finished 42-foot welded stainless steel tube. Variations of more than 0.005-inch from center line straightness could not be tolerated. Note heavy "I" beam used as jig main structure member, and reinforcing tubes tack welded in "I" beam channels. B. R. Russell, shown at right, engineered this job.



varying outside diameters (2.375 to 2.875 inches) throughout its length. Furthermore, when finished, the 42-foot tube could not vary more than 0.005 inch from center line straightness at any point.

It was a "start from scratch" undertaking. How it was accomplished should interest others faced with critical welding jig alignment problems. First, a 42-foot welding jig, as shown in Fig. 1, was constructed, using a 6-inch "I" beam as the main structural member to obtain initial straightness and rigidity. The "I" beam was provided with additional rigidity by lacing long, heavy-walled tubing along each channel side.

Next, nine tube-holding saddles of the type shown in Fig. 2 were constructed and attached to the upper "I" beam surface. These saddles were provided with bolt slots for critical lateral and vertical adjustments. After determining the exact outside tube diameter at the jig station where the saddle would be attached, each saddle along with its mating clamp was milled out to this dimension.

Circular "plugs" or inserts were then machined to fit each saddle clamp. These plugs were double-drilled so that a tangent point on each drill hole coincided at the exact center. A section of each plug was then sawed away and the tangent point of the drill holes dressed until it was in the exact center of the plug. A 0.025-inch piano wire was then threaded through each saddle and stretched from one end of the welding jig to the other. This piano wire was used as one pole of a 110-volt circuit. The jig and tube saddles formed the other pole. The center point of each plug was then adjusted toward the piano wire until just enough

contact was made to light a lamp.

After adjusting each saddle by this critical aligning method, the piano wire and saddle plugs were removed, and the tube sections were clamped in place. Small brass rings milled to the

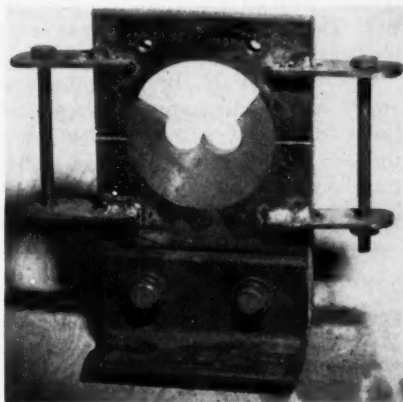


Fig. 2—One of the nine saddles used to hold the tube sections in critical alignment. Note saddle slots for lateral and vertical adjustments. Electrical contact between the centered contact point in the plug and a taut piano wire provided for accurate alignment of saddles with one another.

exact inside diameter of each tube joint, and with a small cutaway section so that they formed a nearly closed "C" design, were inserted at each tube joint. These rings were approximately 1 inch wide and about $\frac{1}{8}$ -inch wall thickness, and overlapped the weld joint a half inch either way. Their purpose was to form a backing for the weld bead, thus assuring a flush interior, and also for use in final alignment of the joint ends for welding.

Next, a deflated fire hose was threaded through the jugged tube sections. When this hose was filled with water at city line pressure, it expanded and opened the "C" section brass

backing rings just enough to bring the tube end weld joint areas into critical alignment. These same brass backing rings protected the fire hose from injury during actual welding. The weld joining the unbeveled tube ends was made with a Linde HW-9 torch and an Oxweld No. 60 stabilized SS welding rod. The Heliarc process was employed.

According to B. R. Russell, shop owner and welding engineer, some of the weld joints were made 16 feet from the end of the finished 42-foot tube, thus complicating the alignment problem. "And to top it off," Mr. Russell

stated, "we had to attach a casting on one end of the tube entailing the welding of the 0.025-inch tube material to 1½-inch casting stock. No tricks were employed in this final phase—just good welding."

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.

Special Machine Tool for Tractor Cylinder Blocks

THIS special Transfer-matic machine tool made by The Cross Co., Detroit 7, Mich., performs 188 operations on a tractor cylinder block. All operations are performed at the rate of 72 pieces per hour at 100 per cent efficiency. The machine has 22 stations—one for loading, 15 for machining, and six are idle. A control unit is incorporated to automatically stop the machine when any tools need changing.



Case History No. 3

Machining Stainless Steel

By G. J. STEVENS*

Problem: A screw machine shop was having trouble with poor drill life and poor chip clearance. The job called for the transverse drilling of $\frac{1}{4}$ -inch diameter holes in $1\frac{3}{4}$ -inch diameter stainless steel bars. Sketch No. 1 shows

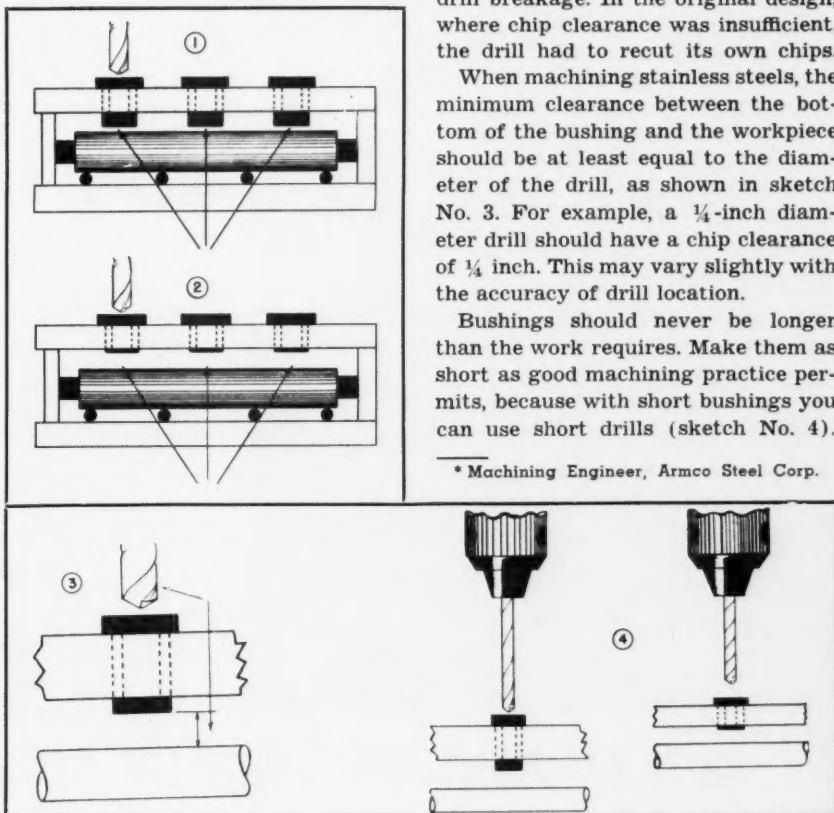
the original setup of the jig.

Solution: Sketch No. 2 shows the changes in bushing design recommended. Drill bushings were ground away to permit enough chip clearance. This also eliminated the cause of excessive drill breakage. In the original design, where chip clearance was insufficient, the drill had to recut its own chips.

When machining stainless steels, the minimum clearance between the bottom of the bushing and the workpiece should be at least equal to the diameter of the drill, as shown in sketch No. 3. For example, a $\frac{1}{4}$ -inch diameter drill should have a chip clearance of $\frac{1}{4}$ inch. This may vary slightly with the accuracy of drill location.

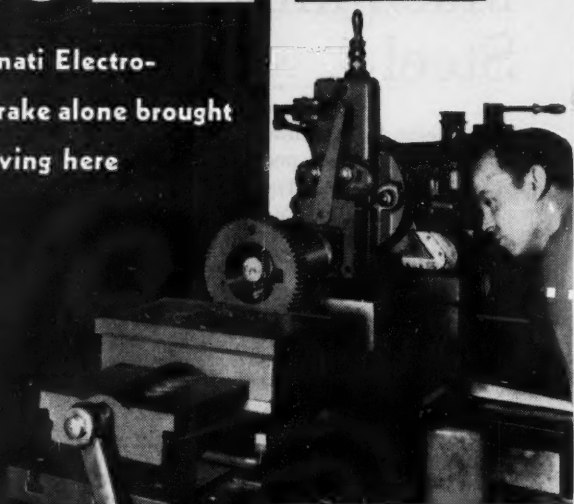
Bushings should never be longer than the work requires. Make them as short as good machining practice permits, because with short bushings you can use short drills (sketch No. 4).

* Machining Engineer, Armco Steel Corp.



Outstanding Time Saver...

The New Cincinnati Electro-Magnetic Clutch and Brake alone brought a 30% time-saving here



The New Cincinnati Magnetic Clutch and Brake, with its single, convenient control lever, gives the operator the fastest, simplest and most accurate control of his Shaper and converts waste time into productive time.

This powerful clutch and brake requires no adjustment, and has a long, maintenance-free life.

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Shaping time on 7 internal oil grooves in these steel sleeves was reduced from 12.5 minutes to 8 minutes, by the Cincinnati Electro-Magnetic Clutch and Brake.

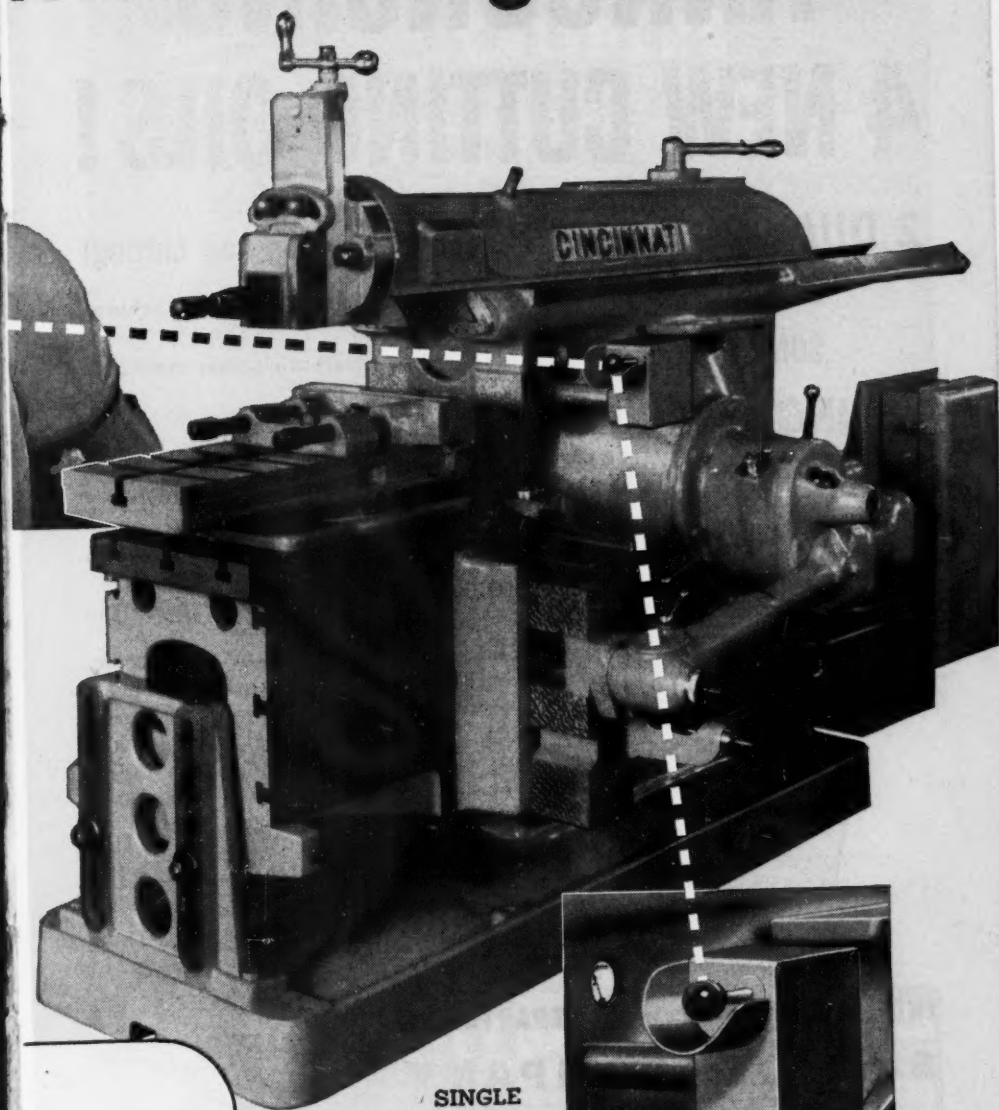


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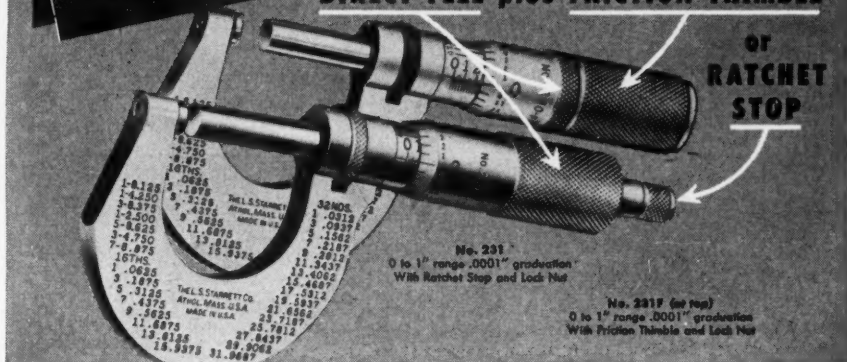


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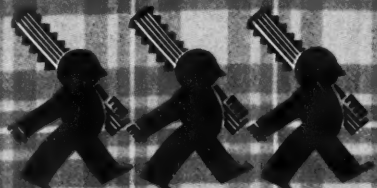
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By GILBERT C. CLOSE

Northrop Aircraft builds cam action dies for producing flanged and beaded stainless steel rings.

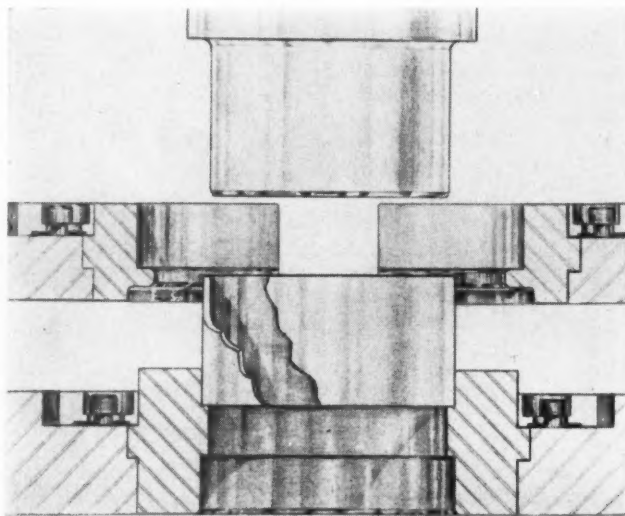
THE idea must come first in most tool development work. With a concrete idea, tool development then becomes a matter of engineering detail. Thus, while many specialized tools are not applicable in detail to other types of work, the idea behind the tool will usually cover a wide range of possibilities.

This holds true for the new cam action dies now in use at Northrop Aircraft, Inc., to produce flanged and beaded stainless steel end rings used to join airplane hot air ducts together.

The Northrop tool is specific and specialized; the idea behind the tool is applicable in a wide range of production possibilities.

These hot air duct end rings, made of No. 321 and No. 347 stainless steel and varying from one inch to 5¼ inches in diameter, were formerly machined from either solid bar stock or heavy-walled tubing material. Machining time per ring was approximately three hours. Material waste was excessive. With the new cam action punch press dies, and using either

solid-wall or welded tubing material of the correct wall thickness, production time is less than five minutes per



▲
Cutaway sketch of the cam action dies, with the top form dies open. A sleeve has been placed in the bottom pusher die, and is resting upon the die shoulder. The punch has started its downstroke, but as yet the cams have not started to close the top form dies. The bottom pusher dies are reversible.

The punch has entered the sleeve. The cams have closed the top form dies. As the punch continues downward, the radius on the punch directly above the sleeve will turn the sleeve outward into the die aperture. The punch shoulder will pick up the top form dies and depress them over the sleeve.



It requires more pressure to buckle the sleeve into a bead than is required to turn the flange, so the flange is the first to form. Here, the top end of the sleeve has been turned outwardly by the radius of the flanging punch, forming a flange which stops when it bottoms against the extremity of the die cavity.



ring and material waste is eliminated. The Northrop cost department estimates that the cam action dies will save approximately \$1 million on the current F-89 "Scorpion" interceptor airplane contract.

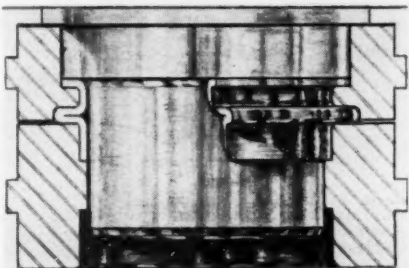
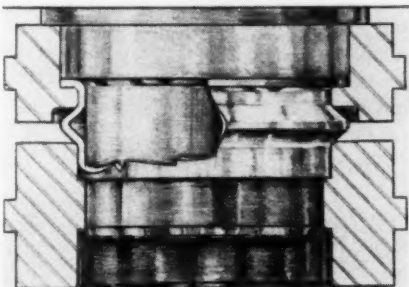
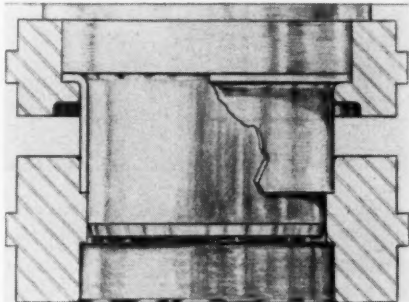
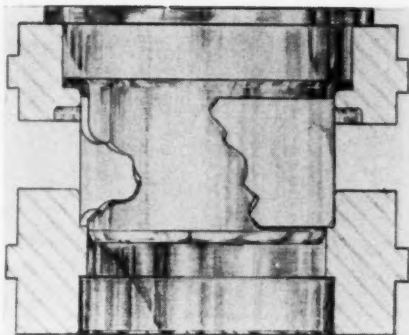
From the start, production of these end rings was complicated by the tolerances involved. The flanged portion of the ring had to be held to a 0.010 diameter and 0.005 concentricity tolerance to assure a perfect seal. The beaded portion of the ring had to meet the same requirements. When machine



The top form dies and punch continue downward and are buckling the sleeve outwardly in the unsupported area between the top and bottom dies.



Here, the dies have bottomed, the flange has been formed, the buckle has formed an upset bead into the recess provided in the top form dies, which restricts the maximum height and thickness of the bead. The material is completely confined by the dies and punch, which makes it possible to control all the physical dimensions of the completed part, i.e., the diameter of the welding flange, the diameter and thickness of the upset bead, the overall length of the part, and the diameter of the part.





This illustration shows a cam action die set mounted in a 6-inch stroke punch press. The bottom dies are stationary. The top dies are made in two segments which are fastened to the two sliding die holders and are spring-loaded in the open position. The top die set is held in location with stripper bolts and is spring-loaded with twelve Danly heavy-duty die springs. On the right side of the die set are parts which have just been formed, and on the sub-bolster in front of the die set are two sleeves to be formed.



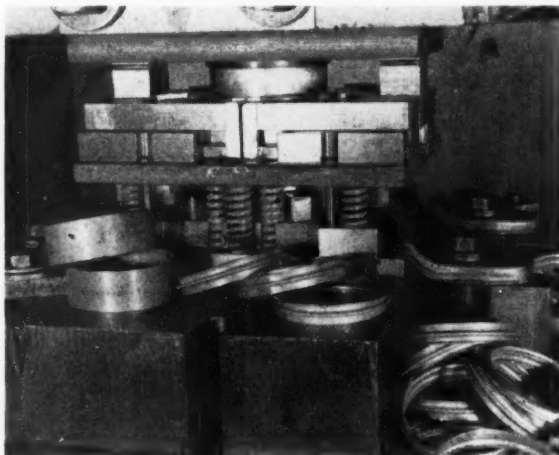
produced from sections of 0.035-gauge tubing; rings over two inches in diameter are produced from 0.035-gauge

production was used, tube wall thickness had to be at least 0.375-inch to provide for flange and bead height. When tubing of the correct diameter and wall thickness was not available, the rings had to be machined from solid bar stock. Up to two pounds of stainless steel was lost per ring when machine production was used.

Today, using the cam action punch press dies, all of the 32 different sizes of end rings are produced from 0.035-gauge stainless steel material. Rings up to 2 inches in diameter are

strip stock welded into sleeves of the proper length.

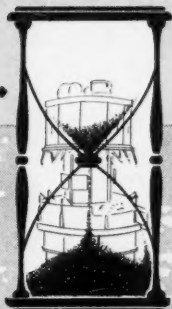
To produce the welded sleeves, the strip stock is first rolled into a sleeve of the required diameter, then inserted over a mandrel for welding. A copper insert prevents the weld from sticking to the mandrel. A unique



Here, the press is about half way down, the cams have closed the top form dies, and the punch has entered the sleeve.

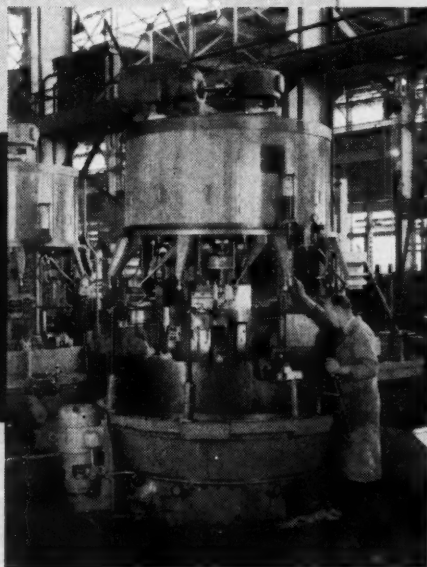
Sands of Time ...

As the Hour glass accounted for the passing of time the Bullard Mult-Au-Matics have, in many plants, established manufacturing time schedules with an attendant record for time savings.

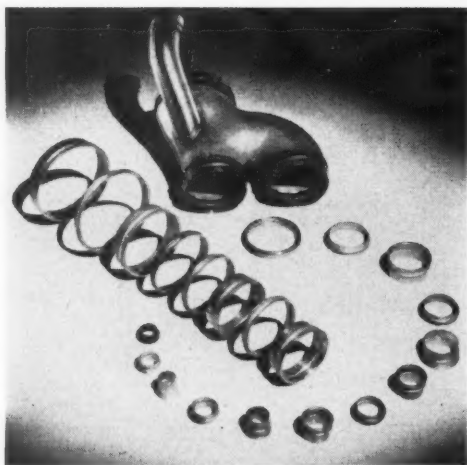


Whatever the pace, there is always manufacturing economy and efficiency in the Mult-Au-Matic Method.

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Here 21 of the 32 different size end ring connectors being made by the new process are shown. Directly behind them is a typical duct section employing four of these connectors or end rings. The flange on the end ring is welded to the flange on the duct section.

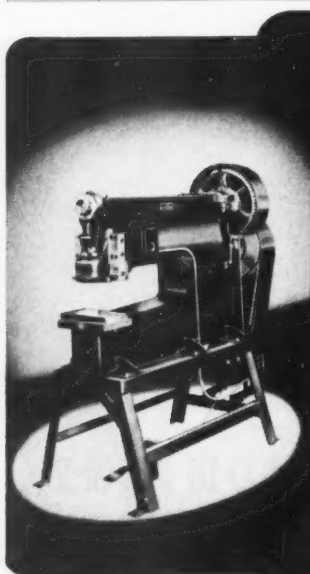


around the weld area.

The sleeve is Heliarc welded, with some build-up at each end of the weld bead to prevent undercutting during final finishing of the weld bead area. After welding, the mandrel with the welded sleeve still around it is placed over a positioning pin which permits the sleeve to be turned into contact with an

clamping arrangement is provided for clamping the strip stock to the mandrel by clamping completely around the periphery of the strip stock except

abrasive belt. This abrasive operation removes excess weld metal flush with the surface of the sleeve. The sleeve is then forced from the mandrel. In



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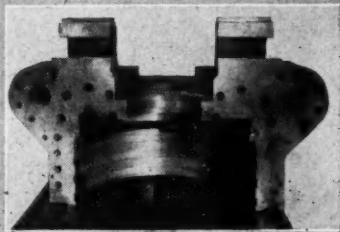
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Photos—Courtesy Worthington Corporation,
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A large-scale photograph of a Cincinnati Bickford Super Service Radial Drill in operation. The machine is a massive piece of industrial equipment with a prominent vertical column and a horizontal arm. A worker is visible on the right side, adjusting the machine. The drill is shown drilling a hole into a large, cylindrical metal component. The machine has a "SUPER SERVICE" logo on its side and "CINCINNATI BICKFORD" branding.

Here 3" pipe tap holes are being drilled and threaded in 3000KW Turbine Generator End Casing.

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Cincinnati 9, Ohio, U.S.A.



The piece of 5.25-inch diameter by .375-inch wall stainless steel tubing shown at the left illustrates the old method of making end rings. A ring has been parted from the tube. This ring was placed in a pot chuck for turning. Extreme care had to be taken in machining these parts to hold the concentricity, and the finished wall thickness was only .035-inch. Directly in front of the tube and ring is a finished part produced by machining. Three hours of machine time were required. The two-pound pile of lathe turnings was produced during machining of the part shown. At the right is a piece of strip stock before rolling into a sleeve. Directly to its left is a welded sleeve. In front of it is a completed part formed from a sleeve with no loss of material. Time required to produce this part from the welded sleeve section was about five minutes.

this preparatory operation, sleeve diameter is held to within plus .005-

inch or minus .003-inch of specification requirements.

In some of the experiments made prior to designing the cam action

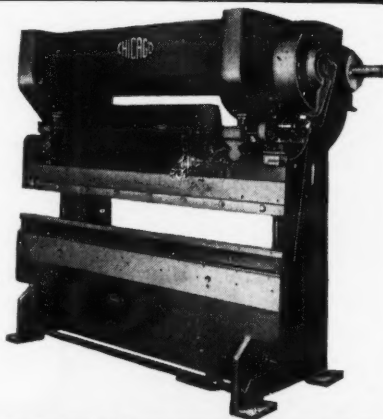


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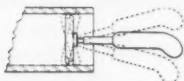


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THE VALUE of a gage is "what it tells", "how well" and "how easily". If the job at hand calls for fixed limit gages, DuBo Plug Gages will give you the best value in dimensional control. DuBo tells MORE, MORE EASILY.



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LONGER LIFE Gaging surfaces of the DuBo contact the bore walls only at the instant of making the check. DuBo gives you effective, economical gaging.



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punch press dies, tests were made to determine the forming characteristics of the sleeves. It was found that by providing a punch with an .090-inch radius for the sleeve to form against, a flange was easily formed. This flange, however, must be restricted or it will continue to form a grommet.

Each set of dies for the various diameter rings was developed to use the same width sleeves, so that one width

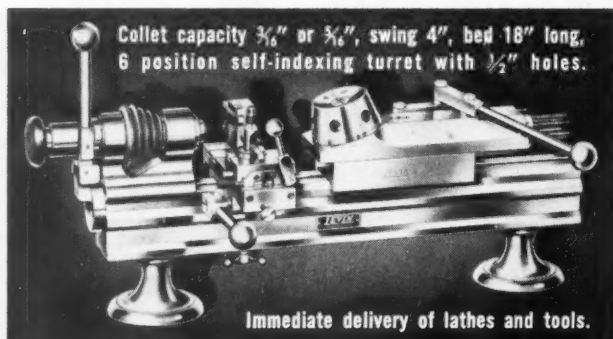
of strip stock could be used for all sleeve diameters. Using strip stock eliminates handling and shearing operations on sheet stock. The strip stock is slit to the required width on slitting rolls so that constant dimensions are maintained. Cost of the strip stock is considerably less than sheet stock in the same gauge.

The flange height in the punch press-formed end rings is .130 inch,

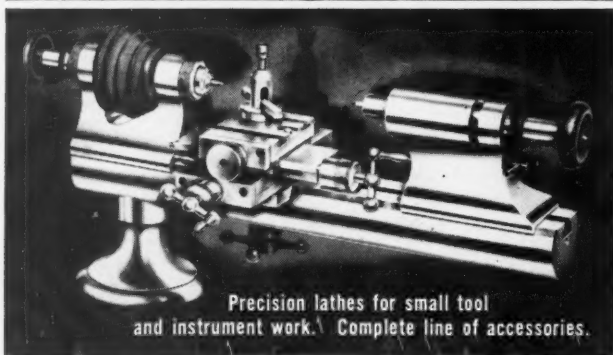
and upset bead height is .180 inch maximum above the outside diameter. At first, the upset bead was trial-formed by using heat on a flash-welding machine, but it was found that heat was not necessary. Better parts were made when they were worked cold, so the cam action punch press dies were developed. The Heliarc welds have been found very ductile, and have given no trouble through the upset or flanged areas.

Conclusion

The first five illustrations with this article, all cut-away drawings of the cam action punch dies in use, explain



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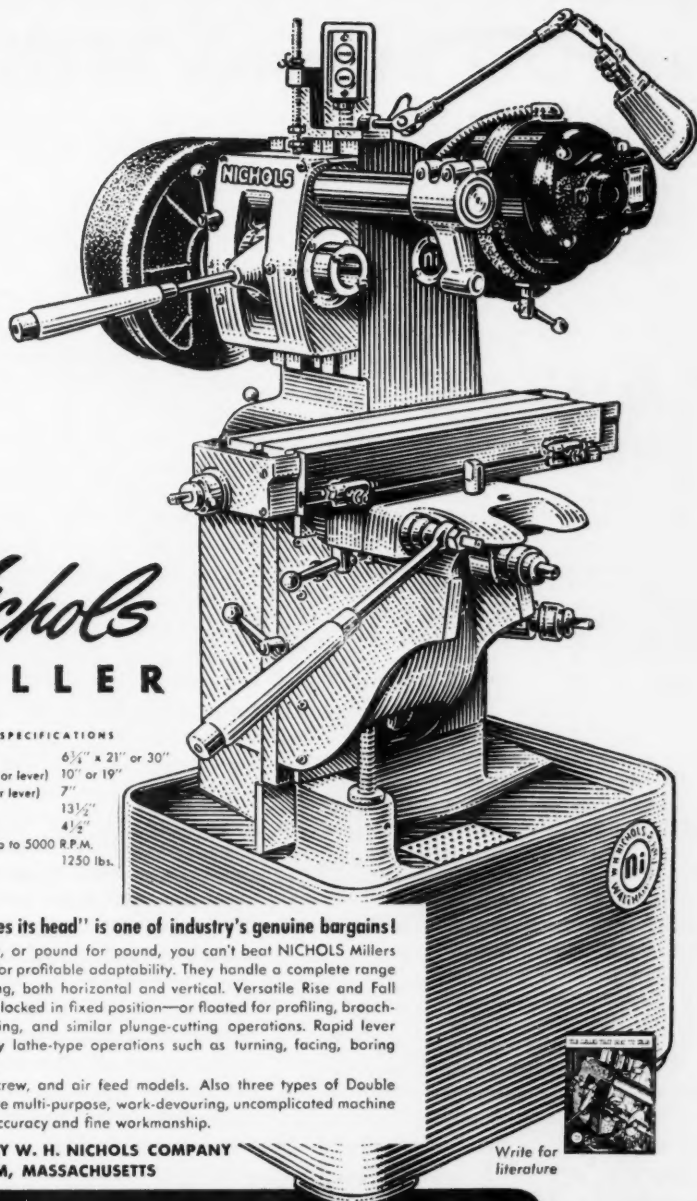
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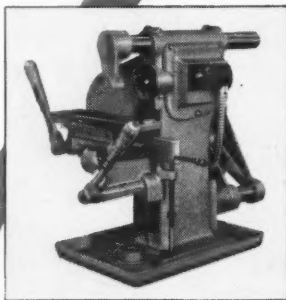
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vividly how these dies operate. It is hoped that these drawings will provide a stimulus for many ideas concerning the production of flanged or beaded parts using punch press operation.

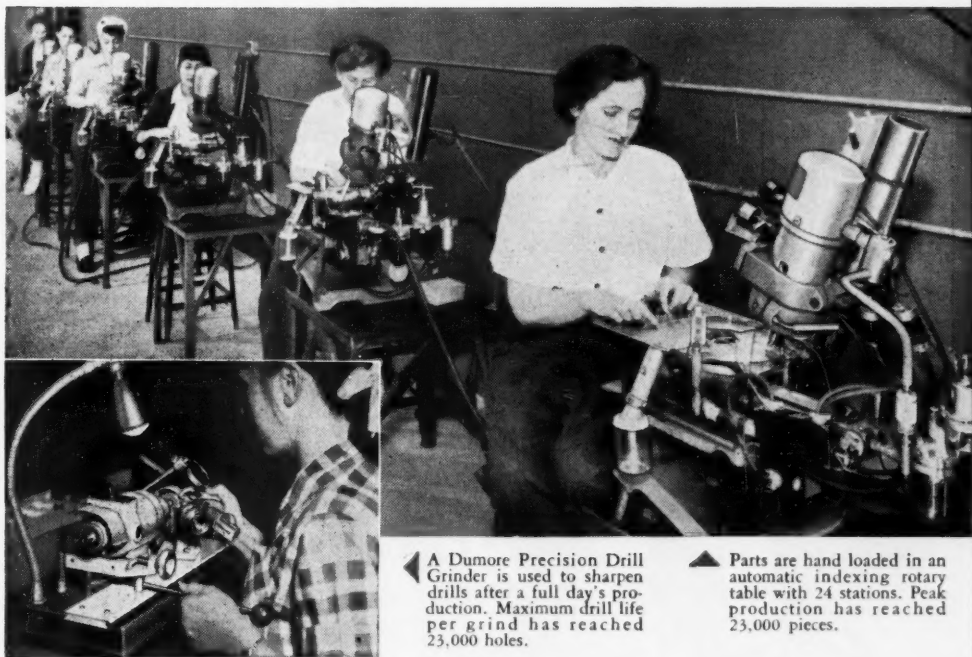
Simple Blueprint Reading with Special Reference to Welding and Welding Symbols. Fourth Edition. Published by Lincoln Electric Co., Cleveland 17, Ohio. 207 pages. Illustrated. Board covers with gold embossed simulated leather. Price, \$1.00 in U. S. A.; \$1.50 elsewhere.

Designed for welders and others engaged in the fabrication of machinery, this book is intended as a guide to a clear understanding of blueprints and how to use them in mechanical fabrication and construction. Special attention is given to the use of symbols.

The book makes a simplified approach to mastering the reading of blueprints. Using a simple welded base as a study object, an explanation is made in step-by-step fashion of how the "sign language" of blueprints is used to transmit information. Large, clear drawings illustrate the explanation. After basic principles are explained, welding symbols and their use are fully described. Examples of where and how they are used are given in each case. To practice visualizing drawings, numerous blueprints taken from shops are reproduced, followed by photographs of the objects as they are made.

The books explains subjects such as perspective drawing, isometric drawing, sight projection, center plane lines, dimensions, scales, sections, explanatory views, development of weld symbols, and types of welds, as well as provides questions and answers on the subjects.

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pany achieves using a Dumore Precision Drill Grinder to sharpen their drills for this job. They actually get a full day of continuous production for every Dumore sharpened drill, without stopping to regrind.

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It was the year 1876. Free America was 100 years old and there were great celebrations in Philadelphia. In London, Queen Victoria was proclaimed Empress of India.

In South Africa, children playing by the Orange River found a bright pebble, too pretty to throw away, but when trader Van Niekirk offered to buy it they shouted with laughter and told him to sell it and make his fortune.

But, nobody wanted to buy the pebble so Van Niekirk dropped it in an envelope and mailed it to a government agent who declared it to be a diamond of 21 carats. Then, the governor of the Colony bought it for five hundred pounds and sent it to the Paris Exhibition as a curiosity.

Nobody paid much attention, but this was the first clue to the existence of the diamond fields that would one day pour out fabulous treasures in gems—and in industrial diamonds, those incomparable cutting points which do so much to increase production and reduce costs.

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How to Increase Production with Portable Tools

By B. G. LAWRENCE

Major steps are presented for discovering opportunities to effectively use portable tools.

TWO basic philosophies are developing among plant men who are seeking to multiply worker output and cut production costs. These are simply: (1) If a job is being done by hand, investigate portable tools to eliminate this hand labor, reduce worker fatigue, and up output; and (2) If a large stationary machine is contemplated to do a job, check to see whether or not portable tools would not do as well,

thereby enabling "bringing the tool to the work rather than the work to the machine."

A tour of quite a few production floors of metal-working plants indicates that important opportunities have been found to apply these basic philosophies practically. A great many of the possibilities, of course, can be traced to the manufacturers of portable tools who have not only come up

with tools to do almost any job, but also with tools incorporating such important design features as: multi-purpose; lightweight; small size; continuous operation without overheat; simplicity of design; low maintenance; and safety.

Discussion with key production personnel indicates that these opportunities on the production floor have



▲

Change-over to a lightweight air-operated tool has doubled production of this job while adding nothing to sanding disc costs.

This operation of driving 3/16-inch chrome-plated screws was once a manual one. Change-over to an air-powered screw driver has increased worker output 150 per cent and resulted in uniform fastening with consequently better assembly.



been developed, not as the result of off-hand walks through the shop, but from scheduled investigations in which data are gathered to answer two questions: (1) Where can the tool do a better job? and (2) How soon can the tool pay for itself? Of course, the investigations differ to suit particular cases, but generally speaking the pattern is the same. Because the approach is successful in convincing executive levels of the value of methods change-over, it warrants presentation as a guide to those who see opportunities and would like to do a job of idea selling. Two major steps are involved in the approach: (1) a cursory examination to list opportunity areas, and (2) actual testing in these areas to define the opportunities.

Cursory Examination

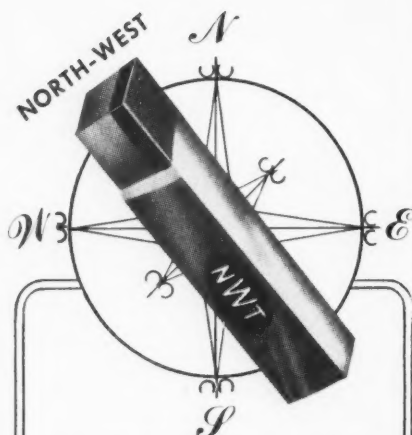
A cursory examination involves a trip through the plant to find all hand operations which might be done by power tools. In addition, this examination includes looking over the present portable tools in use to determine whether they are the best for the job. In these latter cases, for example, questions such as these may be asked: "Are tool speeds and power up to requirements?" "Are there new tool designs which will do this job better?"

"Is the tool too heavy or cumbersome to handle efficiently?" This type of check may seem burdensome at first, but it pays dividends by resulting in a list of opportunities to increase production.

Actual Testing

Defining each of the opportunities means running comparison tests between present and proposed methods. In most cases, this investigation starts with the percentage of time which can be saved by changing a hand method to a tool method. Usually these savings will range from 10 to 50 per cent. Where the savings are 50 per cent or more, the desirability of a change-over is immediately apparent. However, even if only a 10 per cent saving is possible, test data should be tabulated.

There are two factors which might make a small savings important: (1) A number of similar tools may be used



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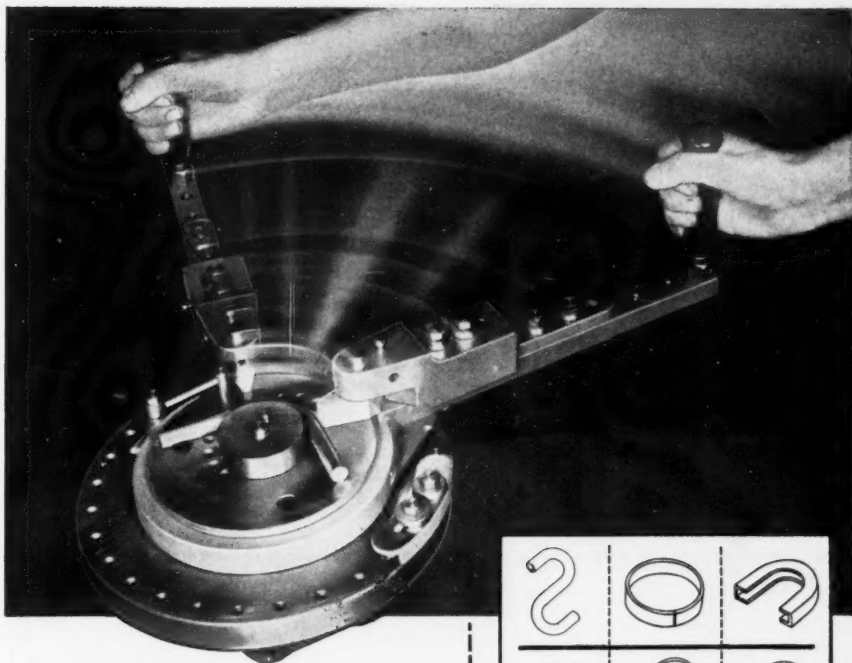
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Dayton 7, Ohio

having a high accumulative savings;
(2) The amount of time which the tool will be in use, if say 60 per cent of a production day, will also multiply these initially small savings. In these cases of small savings, if the price of the tool in question is less than \$100, change-over is doubly warranted. Where the tool cost is above \$200, it is not only obvious that a tool is needed, but equally obvious that care should be taken to keep the investment at a minimum to yield greater savings.

The starting point in this testing need not necessarily be the time-in-use point. In studying screw driving, for example, a starting point may be the torque requirements. Hand-held screw drivers, nut runners, and so on, may not be yielding uniform torques. In these cases, several sizes and types of power drives should be tried. Actually, this type of study has been extended to examining the amount of damage done to surrounding areas as the result of too much torque, slipping off screw heads, and so forth.

Where reciprocating tools may be involved, quality of work may be the governing criterion. This test may show that the shop has standardized on one particular type of chipping hammer when, actually, two or three different types are required for best results. Once the quality investigations are concluded, the time element can be studied. Regardless of exactly how the investigations are conducted, existing hand or power tools should be compared to the latest designs with an eye toward power, speed, weight, and maintenance.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.



Bend a Variety of Materials

Accurately, Easily, Quickly with a versatile DI-ACRO* BENDER

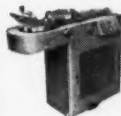
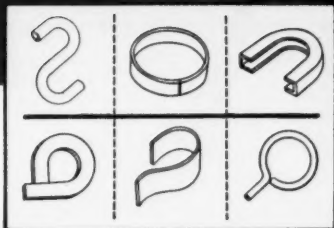
Simple and complex bends can be formed and duplicated in many ductile materials with a versatile Di-Acro Bender. Bending capacity of the five hand operated models ranges from 1/16" wire to 1" round mild steel bar. Many accessories are available for bending various materials and shapes. The Di-Acro Bender can be delivered completely tooled for most forming requirements in solid materials and tubing.

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DI-ACRO HYDRA-POWER BENDER

A universal hydraulically operated bending machine that is equally as flexible as hand operated machine. Di-Acro Hydra-Power Benders are especially designed for those long runs and heavy bending operations which are impractical for manually operated equipment.

*Pronounced
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Grit Magnified 250 Times

An ANT could carry away this cutting tool

WHICH LED TO NEW CONCEPT THAT CREATED CINCINNATI GRINDING WHEELS

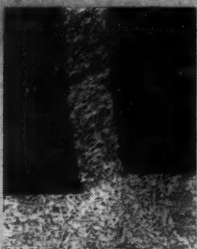
■ The tiny grinding grits shown with the ant is the core of an entirely new approach in grinding wheels. For Cincinnati Milling has proved, beyond doubt, that the grinding process is a true metal cutting process. The grinding grits do not abrade or wear away the surface of a workpiece but form chips which agree in classification with the basic chip types found in other metal cutting processes.

BASIC CHIP TYPES:

Photomicrographs of cross sections taken thru partially formed chips obtained under various conditions in machining operations such as turning, milling, planing and broaching.



Type 1—discontinuous or segmental chip.



Type 2—continuous chip without built-up edge.



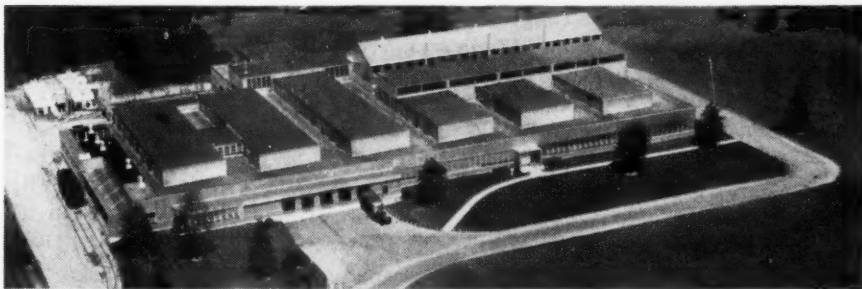
Type 3—continuous chip with built-up edge.

This new concept is not based on hasty conclusions. It represents 25 years of research by The Cincinnati Milling Machine Co. in chip formations, coupled with practical experience in applying the basic fundamentals of grinding to a wide variety of work on both centerless and center-type machines.

For you, this means grinding wheels developed and tested over a period of several


years on the basis of true function—as true cutting tools forming true chips.

Available to you is a field organization of trained machinists who know grinding and grinding machines as well as grinding wheels. For a demonstration on your own machines of how to get the most out of Cincinnati Grinding Wheels, write, wire or phone Cincinnati Milling Products Division, The Cincinnati Milling Machine Co.



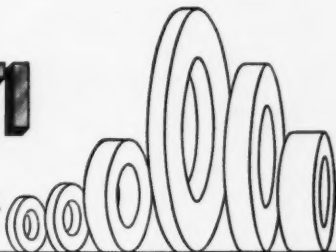
Cincinnati Grinding Wheels are manufactured in this new, completely modern plant.

FREE BOOKLET. Now available to industry is a new booklet entitled "A New Concept In Grinding Wheels." It contains valuable information for everyone interested in grinding operations. A copy is yours for the asking. Just write Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.


CINCINNATI
Grinding Wheels

THE CINCINNATI MILLING MACHINE CO.

Cincinnati 9, Ohio



Band Filing Economy Extends Beyond High Production . . .

By H. J. CHAMBERLAND*

In which the author points out the advantages of this method in filing various shapes and types of materials.

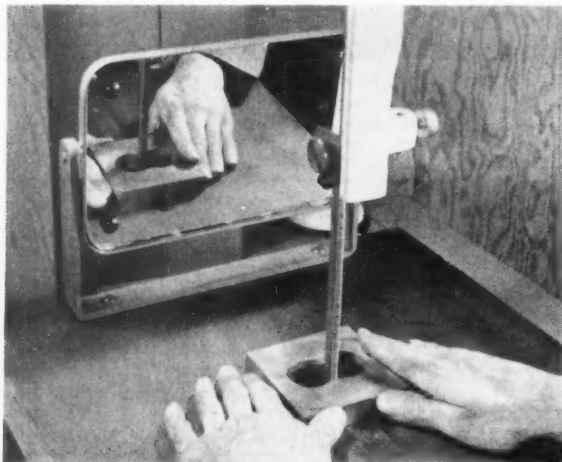
ANY area to be finished by filing is seldom too small, too large, or too intricate to preclude consideration of the continuous process as a primary choice for optimum efficiency. There are file bands to cut all materials, whether the prime objective is production, finish, or a combination of both. It is true that file bands cannot be manufactured in as wide a variety of shapes and widths as other files; how-

ever, on the other hand, the $\frac{1}{4}$, $\frac{3}{8}$, and $\frac{1}{2}$ -inch widths, available in flat, half-round, and oval shapes, can entirely complete or remove the bulk of material from a high percentage of forms.

Bastard-cut file bands, although considered general-purpose tools, should preferably be reserved for steel applications. For cast iron, non-ferrous metals, the light metals, and non-metallic materials, the short angle file, because of its long knife-like teeth, will

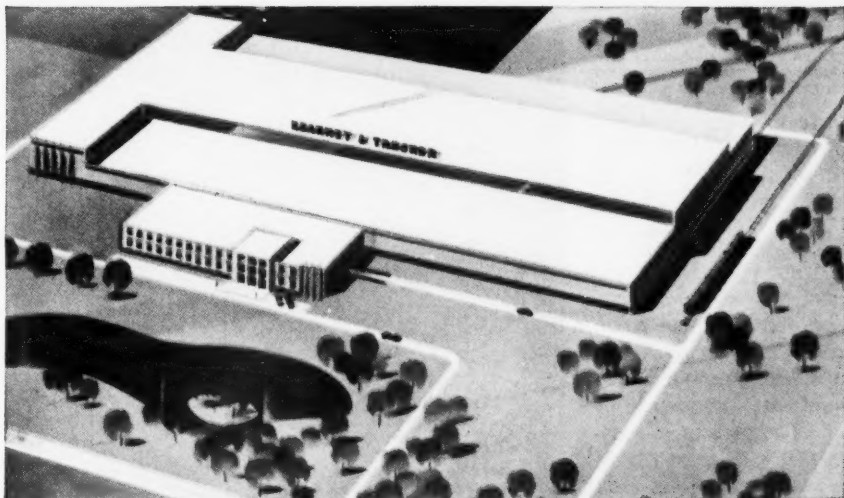
permit a maximum of feeding pressure while generating a minimum amount of heat.

New applications for the band filer are developing rapidly these days, not entirely due to the high productivity



▲
A mirror positioned at the rear of the file band, as shown herewith, helps the operator observe the progress and finish of the cut on the die while he follows the outline to close tolerance.

* Field Engineer, The DoAll Co., Des Plaines, Ill.



Here it is! Kearney & Trecker's new Special Machinery Division — nearly 200,000 sq. ft. of new plant with new tools and equipment. An experienced, fully-staffed team of sales, engineering and production experts is ready and waiting to serve you.

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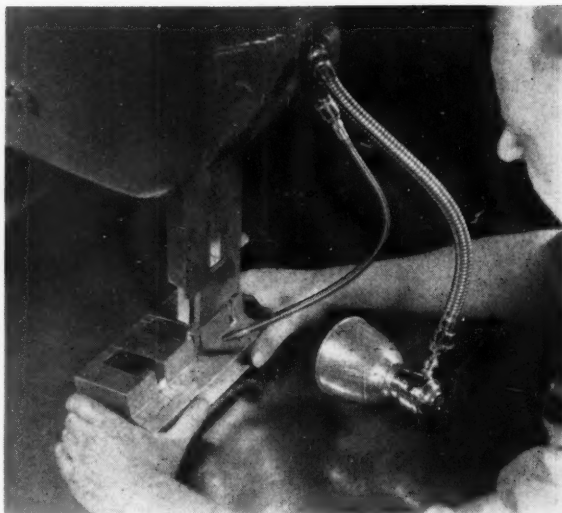
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For details, contact The Special Machinery Division, Kearney & Trecker Corporation, Milwaukee 14, Wisconsin, today.



The versatile band machine with its sawing, filing, and polishing facilities all in one package can reproduce broached forms in substantial volume. Shown herewith is a typical example of such an application.



of the process, but also because the inexperienced operator can, in a short space of time, duplicate the precision of an expert in the art of filing. In most cases, a plant should be able to establish a desirable tool control factor for a given job by referring to the chart shown on page 177.

The original cost of a file band is

negligible when compared to the amount of material it will remove before its cutting efficiency is impaired

to the discarding point. For example, a $\frac{3}{8}$ -inch 16-tooth flat bastard file at a velocity of 100 f.p.m. has been known to slot 1-inch oil-hardening steel for 50 hours and was still cutting efficiently after removing 40 cubic inches of ma-

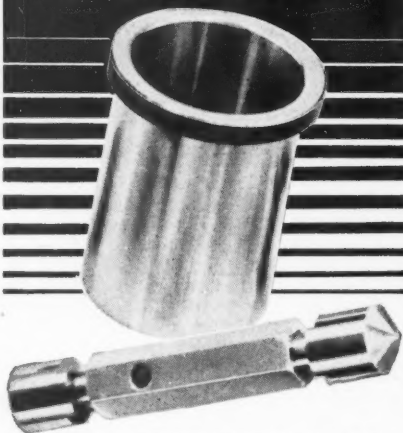


Band filing requires no fancy fixtures. In this instance, a few parallel type pieces of steel clamped to the machine table provide an adequate setup to file flats on the ends of small shafts.

GENERAL APPLICATION BAND FILING CONTROL CHART

MATERIAL	Velocity Feet Per Min.	Cut General & Finish Filing	Type B-Bastard S-Short Angle
S. A. E. STEELS			
Carbon 1010-1095.....	85	14 - 24	B
Free Cutting 1112-1340.....	85	14 - 20	B
Mang. T1330-T1350.....	60	14 - 24	B
Nickel 2015-2515.....	55	16 - 24	B
Nickel-Chrom. 3115-3450.....	50	16 - 24	B
Molybdenum 4130-4820.....	50	16 - 24	B
Chrom. 5120-52100.....	50	20 - 24	B
Chrom. Vanadium 6115-2195.....	50	20 - 24	B
Tung. 71360-7260.....	50	20 - 24	B
Sil. Mang. 9255-9260.....	50	20 - 24	B
18-8 Stainless 30905-15.....	50	16 - 20	B
Oth. Stainless 51210-51710.....	50	16 - 20	B
OTHER STEELS			
High Speed.....	50	20 - 24	B
Tool (Oil Hard).....	60	14 - 24	B
Tool (Air Hard).....	55	14 - 24	B
Drill Rod.....	55	24	B
Armor Plate.....	55	16 - 24	B
FERROUS CASTINGS			
Iron.....	125	10	S
Semi-Steel.....	125	12 - 20	B
Nickel Iron.....	110	12 - 20	B
Malleable Iron.....	125	12 - 20	B
Swedish Iron.....	125	12 - 20	B
Meehanite.....	100	12 - 20	B
COPPER AND COPPER BASE ALLOYS			
Copper (Soft).....	100	10	S
Copper (Cold Rolled).....	100	10	S
Brass (Cast).....	125	10	S
Brass (Soft).....	125	10	S
Brass (Navy Rolled).....	125	10	S
Bronze (Cast).....	100	10	S
Bronze (Soft).....	125	10	S
Mang. Bronze.....	85	10	S
Nickel Alum. Bronze.....	85	10	S
Beryl. Copper.....	80	10	S
Phosphur Bronze.....	80	10	S
Copper Silicon.....	80	10	S
ALUMINUM AND ALUMINUM BASE ALLOYS			
Alum. Pure (Rolled or Forged).....	125	10	S
Duralumin 14ST.....	125	10	S
Duralumin 17ST.....	125	10	S
Aluminum (Cast).....	125	10	S
NICKEL AND NICKEL BASE ALLOYS			
Nickel (Cold Rolled).....	50	12 - 16	B
Monel Metal.....	75	12 - 16	B
Nickel Silver.....	100	12 - 16	B
OTHER METALS AND ALLOYS			
Babbitt Lead.....	125	10	S
Dow Metal.....	100	10	S
Gunite Castings.....	100	12 - 20	B
NON-METALS			
Builders Board.....	125	10	S
Fibre.....	125	10	S
Hard Rubber.....	125	10	S
Bakelite.....	125	10	S

FOR ACCURACY IN PRODUCTION



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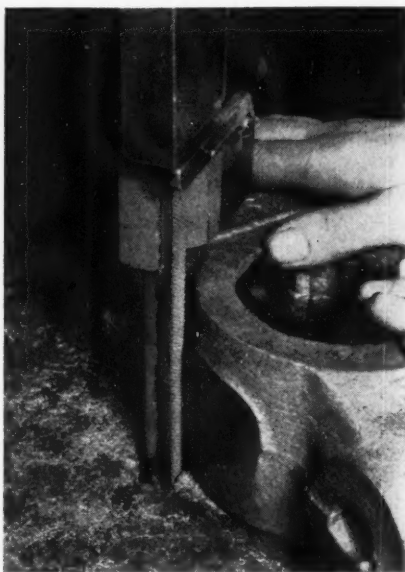
- A.S.A. standard and special drill jig bushings.
- A.G.D. plug and ring gages, both new and chrome plate.
- Gages salvaged by hard chrome plating.

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terial. The 12.5 pounds of feeding pressure were considered light and, therefore, heavier feeds would have increased the volume of chips and so would have a $\frac{1}{2}$ -inch file band of coarser cut. In this instance, the band was actually "milling"; however, if we



Foundries can save on material while reducing cleaning costs by first removing gates or risers by band sawing and subsequently finishing the cut with a short angle file band.

break down the figures and assume that the file was normally removing $1/32$ inch of stock from a number of parts, the tool would have surfaced approximately 3,000 square inches, and this is indeed exceptionally long file life on steel of 31 Rockwell "C" scale hardness.

The same bastard file would obviously survive considerably longer on softer steel, and the life of a short angle file would be limited only by the abra-



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• Cimcool scores over old-fashioned coolants because it's a *chemical emulsion*. It permits faster speeds and increases tool life because Cimcool combines friction reduction and cooling capacity in a degree never before attained. It's longer lasting in machines, too. So Cimcool reduces downtime and cuts labor costs for cleaning and changing.

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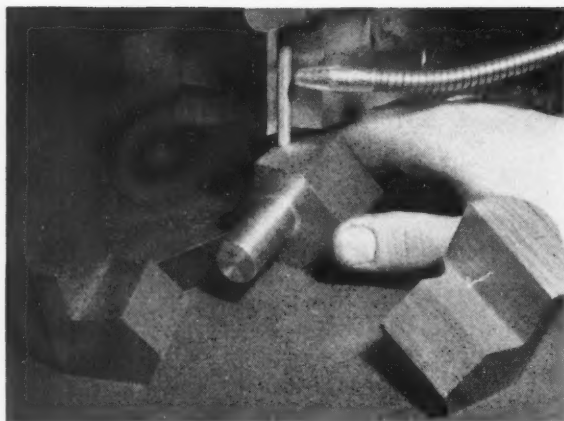


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OF ALL METAL CUTTING JOBS





These punches are each accurately band filed in 8 minutes, providing a substantial production increase and comparatively longer life span for the files than with the previously used method.

are available only in 10 teeth per inch and, consequently, any desired degree of finish is governed by decreasing the feeding pressure more or less at the final stage of the operation.

siveness of the non-ferrous metals or non-metallic materials being so cut. The fact remains that while short angle files are fast and cool cutting for reasons already mentioned, they

Where production volume permits, in using bastard cut file bands, it is advisable to remove all material possible with a coarse file and complete the job with a fine file. The change can

**SHALLOW HOLES...DEEP HOLES
DRILL THEM *FASTER,*
ALL *BETTER***

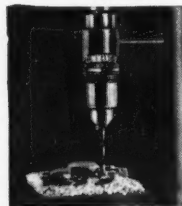
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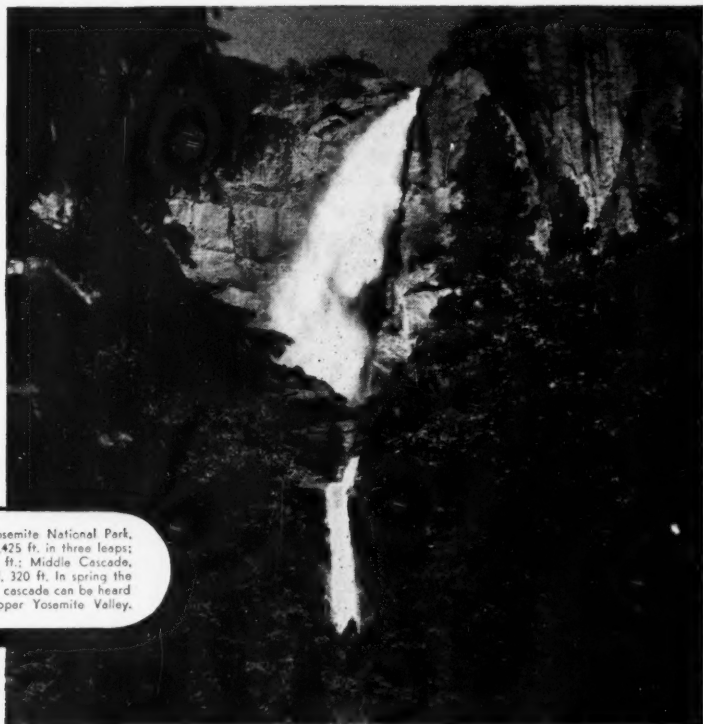
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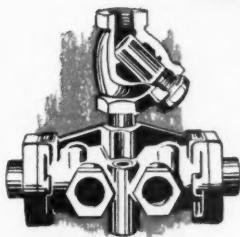
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LOGANSFORD MACHINE CO., INC., 801 CENTER AVE., LOGANSFORD, IND.

be made in a matter of a few minutes, and the outcome will be increased productivity, suitable finish, and longer tool life. The fact that feeding pressure can be exerted to the point of stalling the band provides no excuse to make the attempt as an experiment. Best results are obtained from a medium, but particularly even, pressure regardless of the type of material involved; a fine cut file and light feeding pressure will leave a finish that can be given a mirror-like appearance in seconds with a polishing band. However, a new operator soon realizes that the proper file band velocity is one of his major assets; a decrease or increase of even 5 f.p.m. in velocity, based on general recommendations, could well provide the exact speed for some particular alloy, plastic, or other non-metal material.

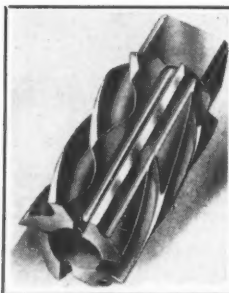
File Bands Are Precision Tools and Must be Cared for Accordingly

Chip-loaded files will cause bumpy filing and will scratch the work; teeth are easily kept clean and free-cutting with a file card. File segments are interlocked in two directions and in such a way that work pressure automatically pushes each consecutive segment into super-smooth cutting. Be-

cause of the unique interlocking features, chips should not get between the band and segments but they occasionally do; watching the band closely on this score will prevent any segment from "stubbing" its toe. No "bumps" will occur as the joints pass over the work if the guides are correctly aligned and if the band is properly joined and tensioned, has ample back support, and, above all, kept clean.

Tension on the file band should be released when it is not in use. When removed from the machine, the band should immediately be made ready for future use. Some means of storage, preferably a cabinet designed specially for file bands, should be made available to the operator to prevent possible damage from rust, nicks, oil, and other destructive elements likely to impair and unnaturally shorten the intended useful life span of these tools.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.



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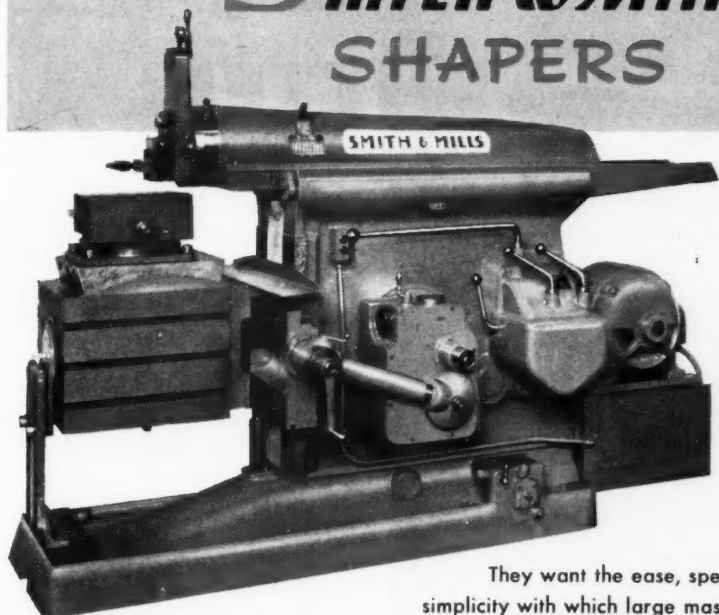
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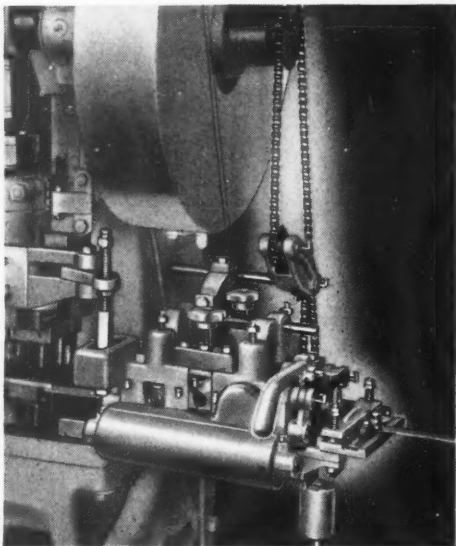
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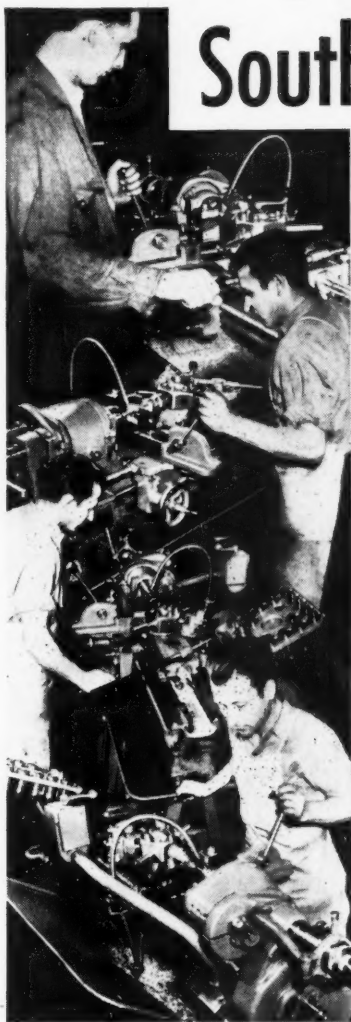
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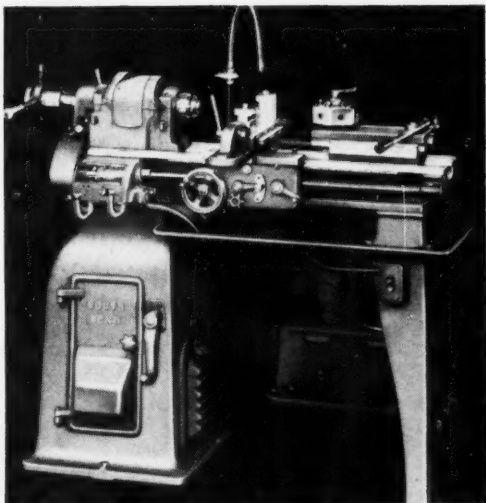
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Swing 10 1/2"	Power longitudinal feeds
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Collet capacity 1"	Power cross feeds . . . 48
Spindle bore 1 3/8"0006" to .0309"
Spindle speeds 12	Thread cutting feeds . . 48
. 55 to 1400 r.p.m. 4 to 224 per inch



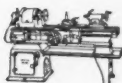
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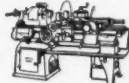
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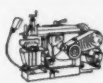
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By H. G. FROMMER

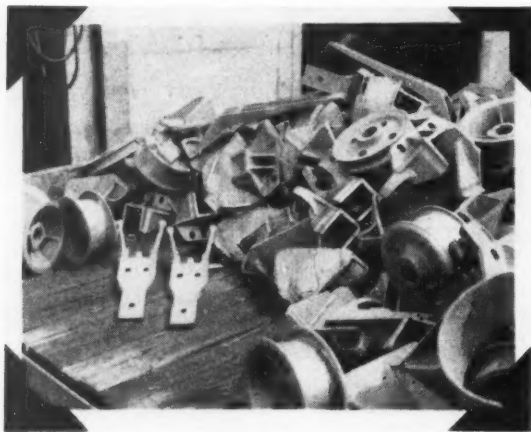
Here the author explains the various uses, other than advertising, for the camera within the average plant and he gives all instructions required for a layman to do a good industrial photography job in addition to his regular work.

THE value of photography as an aid to selling, thru advertising, is well known. Rare indeed is the catalogue sheet, pamphlet or sales circular that does not contain photographs. However, not as well known is the work the camera can perform for design and manufacturing personnel, for the industrial relations staff, for research, inspection, shipping and plant engi-

neering. There are many instances where a well-taken picture proves to be helpful and profitable.

Take, for instance, the case where one branch of a larger organization accused another branch plant of shipping empty return pallets inefficiently because of poor stacking and disorderly arrangement. Accusations went back and forth, each branch accusing

the other of the same misdeeds, until the foreman in charge of shipping and receiving of one of the plants called for the photographer to make a graphic record of an incoming, poorly stacked shipment. A second shot, taken shortly thereafter, pictured the



Foundry deliveries by dump trucks caused untold hours of sorting.

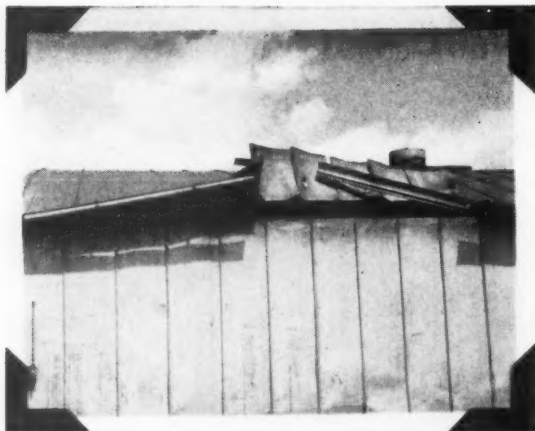
(Top and Middle Photos) Pictures of proper stacking technique for certain castings served as basis for discussions between foundry representatives and plant management.

(Bottom Photo) The result: Castings arrive ready for removal by power lift truck without need for dumping, rehandling and sorting.

method that should have been used to allow the shipping of a greater number of return pallets in the same size truck. Evidence such as given on a clear photograph is seldom disputed and the arguments between the two plants ceased within a short time.

A bone of contention of long standing was the method used by some foundries to make casting deliveries. Loaded planless onto a dump truck, mixed and in large quantities, the castings were dropped onto an unloading platform in the factory yard necessitating countless hours of sorting and loading into boxes or onto pallets. Several pictures were made of the poor condition as well as of the proposed method of having the castings loaded into boxes or onto pallets while they were still separated at the foundry. These pictures were used as a basis for discussions between plant management and foundry representatives. A solution





Photography provides an excellent means for recording damage almost immediately after it happens. Here is a picture of a roof damaged by windstorm taken shortly before repairs began.

was worked out and now a good percentage of the deliveries are made in such a manner that boxes or pallets of like castings are removed from the trucks by power lift fork trucks thereby eliminating hundreds of man-hours per month.

When a severe windstorm hit our city and our plant roof was damaged, photographs recorded the damage fully and permitted immediate repair to prevent further damage of stock and equipment within the building. Photographs of damaged shipments will often expedite claims, especially when it is absolutely necessary to use the received material before the insurance adjuster or the carrier's investigator arrives.

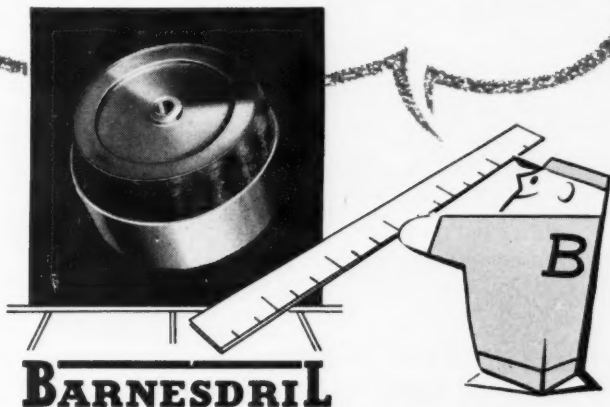
Our tool design department uses photographs of interesting jigs and fixtures, as well as those of unusual methods, to train new designers and to give them visual aid when designing fixtures similar to the ones pictured. For that purpose, an album is kept within the department and pictures of unusual fixtures and methods are taken regularly.

After the building of special machinery or testing equipment, a photograph showing all controls is made. All switches, knobs and levers are then designated with black letters on the face of the photograph, and it, together with a typed instruction sheet, is then posted near the equipment. This method often eliminates training and re-training of several operators; it eliminates verbal instructions that may be forgotten, misinterpreted or altered as they are passed on.

Plant safety can get a boost thru an alert safety director who has at his disposal the occasional services of a plant photographer. Any unsafe condition that is spotted should be recorded by photo, provided with a suitable caption and posted on all bulletin boards. Unsafe stacking of material, non-regulation lifting equipment, overloading or broken chains, slings, hooks, and so on, make excellent material for photo coverage. A well-written caption will make workers think and help prevent the repetition of dangerous habits.

There is little need for going into detail as to the use of the camera for personnel matters. Those firms who have a house organ rarely get along without the camera. Photographic coverage at the picnic, the Christmas party, ball game, bowling alley, the

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SEPARATES SWarf FAST**



BARNESDRIL *Magnetic Coolant Separator*

Large area of contact with the coolant is designed in Barnesdril Separators to provide a long-interval exposure to magnetic attraction.

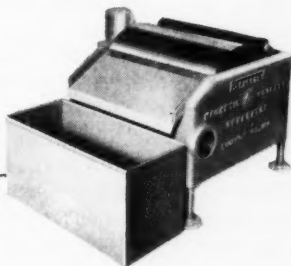
For example, on a 20 GPM size, Barnesdril Separators have more than 275 square inches of magnetic drum surface in contact with the loaded coolant at all times. This contact area runs for a total flow distance of 27 1/2" through the highly concentrated magnetic field.

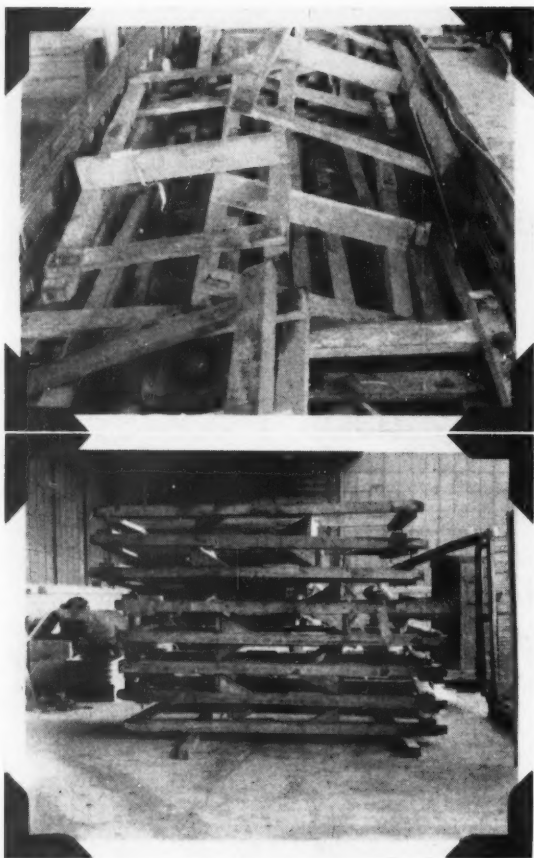
That's why a normal coolant supply can be cleaned rapidly and returned, available for effective circulation at all times.

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(Top Photo) Graphic record of a poorly and inefficiently stacked received shipment. (Bottom Photo) The correct stacking method resulted in more frames per car load. Pictures such as these may save thousands of written or spoken words.

Other uses for the camera that should be mentioned without going into details are the recording of the progress of a building program, the recording of plant layout boards, the copying of an occasional document, (also known as microphotography, and can be done with almost any ordinary camera) and the photographing of important visitors. Other plants will have, in addition to the idea mentioned above, special applications for photography.

Look around in your own department and you will find several camera enthusiasts. These persons

open house, and similar plant functions, is a must. Employees are interested in seeing their pictures, and even more so, in showing them to their friends and families.

Product designers use photographs to keep records of experimental models, of failures in the field and of performance tests. Specimens used in connection with strength and endurance tests are usually photographed so that the bulky specimens themselves may be disposed of.

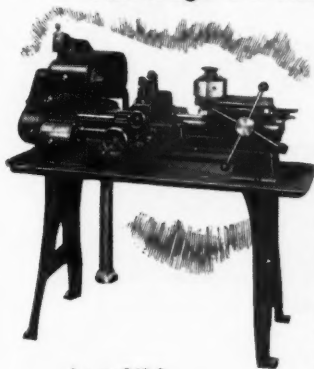
may not be versed in the type of photography used in a plant, but picture taking is a cinch once you have mastered the few rules outlined below. Ask one of these men to become your official spare time photographer. He will like the job as it offers variety and an occasional break from his regular work. If he is worried about his capabilities, tell him that photography is so simple that anyone can learn within an hour all that is required to do a good job.

Three types of cameras are especial-



"This judge is a stickler for precision. His plant is packed with

Logan LATHES!"



Logan 940-2
QUICK CHANGE GEAR
TURRET LATHE
11" Swing, 1" Collet Capacity,
1 3/8" Spindle Hole

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LOOK TO LOGAN FOR BETTER LATHES AND SHAPERS

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This picture of a dangerous stacking practice provided ammunition for the safety director. A clever and thought-provoking caption was attached to it and it was fastened to all bulletin boards. The caption ended with the limerick:

If piled up right
And straight and steady,
It won't come down
Until you're ready.

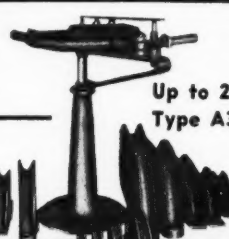
advantages. The press camera produces a large negative that can be enlarged without losing too much sharpness and that can be retouched. More-

ly suited for industrial photography; the press camera, the reflex camera and the 35 millimeter "candid" camera. Depending upon the nature of assignments, each type offers its own

over, the press camera offers the possibility of making single exposures and having them developed without waiting for a whole roll of film to be finished. The reflex camera shows read-

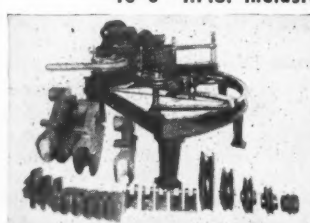
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HAND AND POWER**

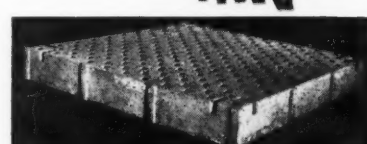


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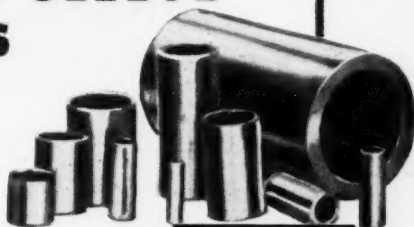


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For hot or cold bends of various shapes, pipes, bars, etc. 5' sq.; 7' sq. (3 1/2' x 7' pairs) suitable for welding together. Other sizes or custom made to your specifications.

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STANDARD SIZE JOHNSON SLEEVE BEARINGS

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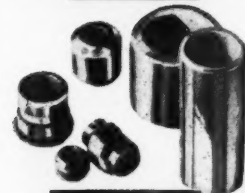
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Electric Motor



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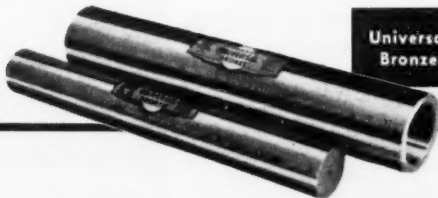
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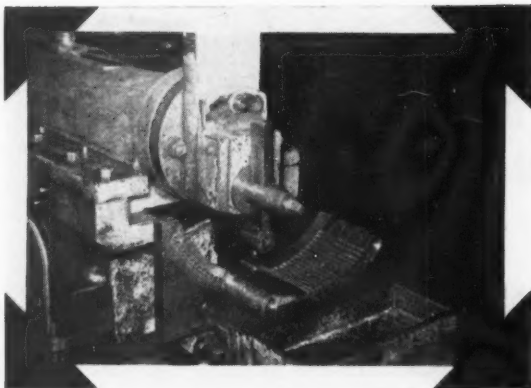
Over 90% of your sleeve bearing needs can be filled from Johnson Bearing Distributor stocks. This is the most complete line of bearing types and sizes on the market. The Johnson Bearing Catalog lists them all . . . keep a copy handy for ordering. If you do not have the latest catalog, write today for your copy.

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Sleeve-Type



Pictures of unusual methods are kept on file for processing and tool engineers. Although most of the pictures in this article were taken with a press camera or a reflex camera, this one was made with a 35 millimeter candid camera. Flash exposure was used.

ily and exactly the picture you are taking, as you take it, it has a fairly large negative (2¼ in. x 2¼ in.) but it cannot be retouched under normal circumstances. Also, by holding the reflex camera, upside down, over your head,

you can take pictures over some obstacle and still see exactly what you are taking. The 35 millimeter camera however, has the advantage of its small physical size and the comparative low cost of the pictures. The negative is very small and pictures can be enlarged to 8 in. x 10 in. only if the negative is clear and sharp.

Before buying a camera, talk the

LAST WORD WHEEL DRESSERS Simplify the Job!

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- Dresses grinding wheel at point of contact.
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Above: These and countless other forms may be dressed simply with the Last Word Wheel Dresser. Write for Catalog

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"More than 130 SKIL Drills Have Helped Keep Smooth Production"



says **Mr. Martin Konoske**,
Production Superintendent,
Fletcher Aviation Corp.,
Pasadena, California

"We make good tanks and we're proud of them, but equally important is the 'on time' delivery stamp at the conclusion of our contracts," says Martin Konoske.

"In meeting deliveries, SKIL tools perform a very necessary function. We have standardized on SKIL portable

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Workman James F. Austin (see below) explains this choice. He says, "Power, durability and handling ease... that's what sold me on SKIL Drills."

Contact your SKIL Distributor for help in selecting suitable SKIL Tools or phone or write the nearest SKIL Factory Branch.

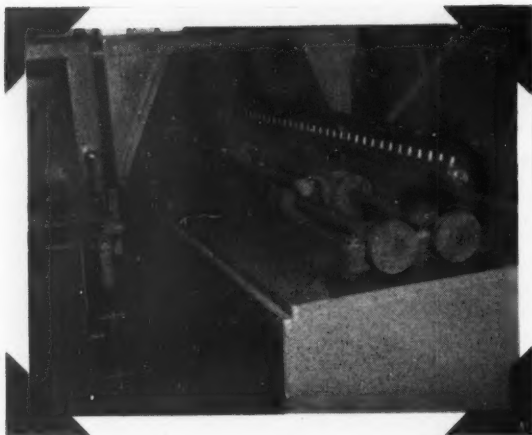


James F. Austin uses SKIL Drill Model 49. Special balance and scientifically designed contour-grip give non-tiring weight distribution and relaxed work position. Built to aircraft specifications for ease of handling, compactness, light weight.

SKIL
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SKIL Products are made only
by SKIL Corporation
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The working mechanism of special equipment built within the plant is photographed for future reference. Such pictures are very helpful when redesign becomes necessary.

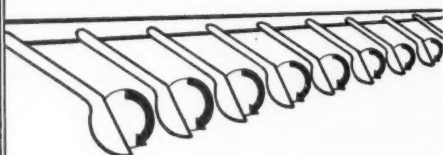
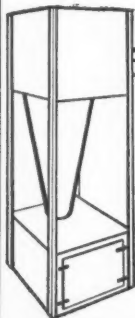


can be ready to go on an assignment at a moment's notice. Read and have him read the instruction book that comes with the camera to learn about the camera's knobs, levers and adjustments. If such a

proposed applications over with your camera dealer and then make up your own mind. Be sure to purchase flash equipment, a light meter and a large gadget bag so that your photographer

booklet is not available, see your dealer. It takes but a few minutes to learn the mechanics of the equipment. Ask him also to show you how to load and unload film in the camera.

STOP DUST With DUSTKOP



300 cfm to 10,000 cfm per unit (22 models) standard, pre-tested, available from stock.

Low cost, immediate control of dust from one remote dust source, or from a whole shop!

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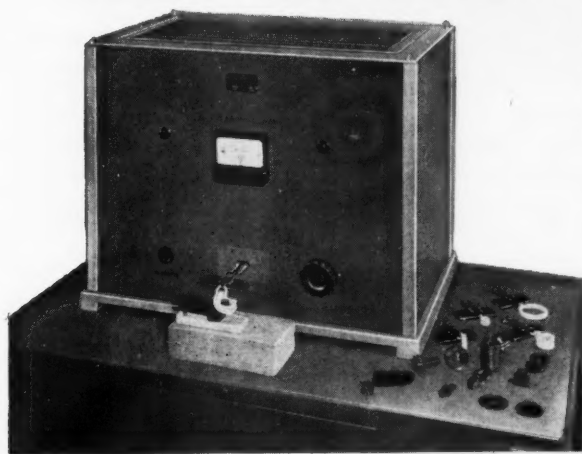
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• ECONOMICAL OPERATION

No special power installation required. Operates on 110 volts, 60 or 50 cycle line at unity power factor.

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Guaranteed for continuous duty cycle and stated performance.

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WILL HEAT TO 1500° F.

$\frac{1}{8}$ " steel rod 1" length in approx.	1 second
$\frac{1}{4}$ " " " " " " " " " " "	3 seconds
$\frac{1}{2}$ " " " " " " " " " " "	15 seconds
1" " " " " " " " " " "	60 seconds

Will melt 4 ounces of brass or steel in 4 minutes. Equally well suited for heating of non-ferrous metals.



Complete unit with line connection and load coil.

\$870.

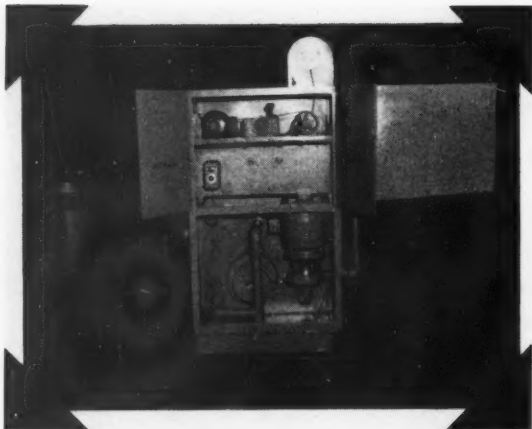
f.a.b. factory



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All Lepel equipment is certified to comply with the requirements of the Federal Communications Commission
Write for Lepel Catalog MMS-12



Operating instructions may be written or lettered on a photograph of the type illustrated here. Valves, levers and handles may be identified and their uses listed.

The A B C of Photography

There are three things that determine the proper exposure of film; 1. The film speed; 2. The diaphragm opening (lens opening), also called

f-stop; and 3. The shutter speed (or exposure time). All three must be in proper relation to each other to result in a good exposure.

The film speed is built into the film and is measured and rated. Each film carries an instruction slip that states the film speed for daylight as well as for artificial light (Tungsten). Usually, there is a difference in the rating between the daylight and the artificial

How SQUARE HOLED SLEEVES SPEED UP TOOL-MAKING!

One of the most difficult problems in tool making can be solved easily and quickly with Sturdy Square Holed Sleeves. The perfection of broached square holes can be had in boring bars, milling cutters and many other applications at a small fraction of the cost of imperfect hand-made square holes. The Sturdy Square Holed Sleeve consists of a round sleeve with a perfectly square hole broached through the center. This hole is tapped at one end to receive a back-up screw which is furnished with the Sleeve. The Sleeve can be sweated or pressed into a drilled and reamed hole to make a perfectly square accurate hole in a very few minutes.

The Sturdy Square Holed Sleeve will save you many hours and many dollars in the making of boring bars, tool holders and other tools requiring square holes.

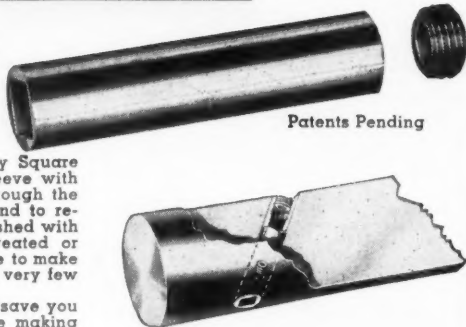
SLEEVES MADE IN FOLLOWING SIZES:

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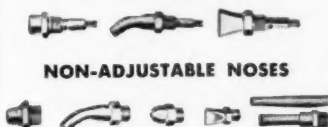
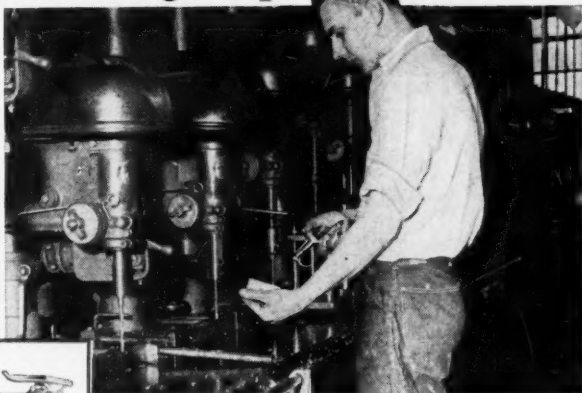
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You'll find there are Schrader Blow Guns that *just suit* any operation you may have . . . reliably and economically. The #9326 Schrader Blow Gun shown here, for instance, will take the toughest treatment.

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UNIVERSAL ENGINEERING COMPANY
FRANKENMUTH 9, MICHIGAN 156-B

light within the same film. The film speed cannot be altered by the photographer (unless filters are used) and therefore we will consider it a predetermined value. However, the diaphragm opening and the shutter speed must still be set by the photographer.

Although each film's instruction slip gives these settings for various light conditions (as f.i. sunlight, cloudy,

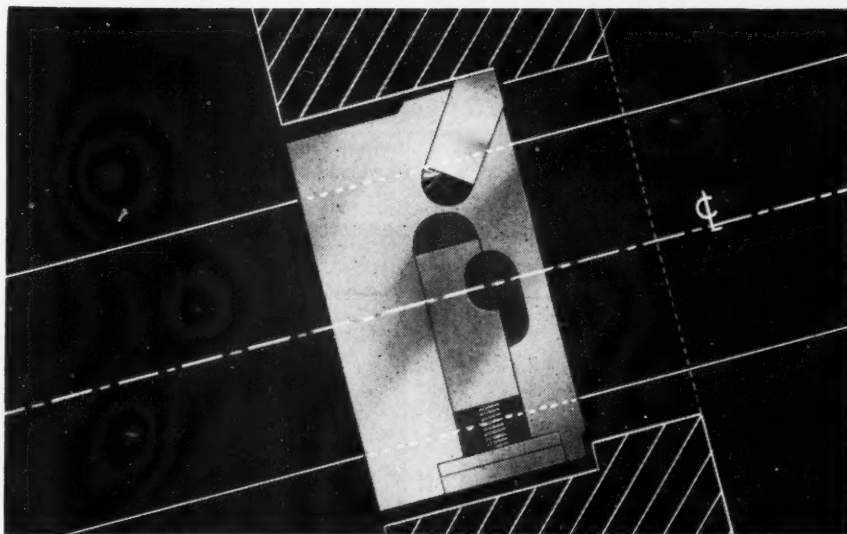


The press camera with a negative size up to 4 in. x 5 in. is versatile and can be used readily to expose single shots that can be developed at once without the need of exposing more pictures as is the case with cameras using roll films. Illustration courtesy Burke & James, Incorporated.

shade, and so on), to do a good job of determining these settings, a light meter is indispensable. First, the light meter is pre-set to agree with the film speed and then the light reading is taken. The meter will then give the photographer a choice of several combinations of diaphragm openings (f-stops) and shutter speeds that will result in correct exposures.

Obviously, each combination will allow about the same amount of light to hit the film. Therefore these combi-

**Get fast, positive line boring
accuracy for 2½" to 17" dia. with . . .**



DAVIS SINGLE CUTTER MICROMETER ADJUSTABLE BLOCKS

HERE's the way to boost efficiency on general purpose jobs that demand rigidity and a wide range of cutter adjustments.

In addition to regular line boring with either standard or special bars, Davis tools with the exclusive adjustable feature are easily adapted to counterboring, undercutting, grooving, facing or chamfering. Block and cutter adjust as a unit to assure full cutter support at all settings.

Made of high grade tool steel, hardened and ground, the blocks can be furnished with High Speed Steel, Cobalt, Stellite, Tungsten Carbide tipped or Tantalum Carbide tipped cutters.

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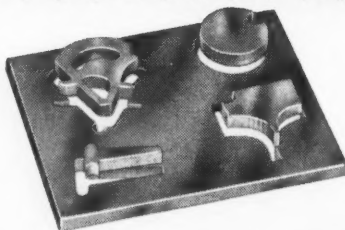
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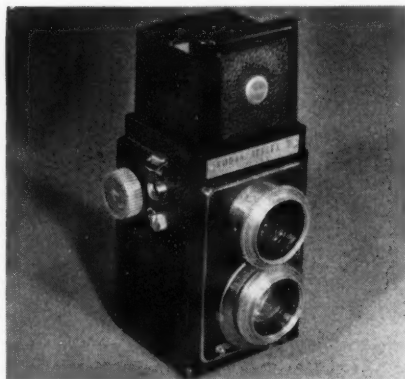


Send today for the graphic story of Atlantic's family of fine saws. If you have a specific saw application you are wondering about, include a brief description — it will meet interested engineering attention and be promptly acknowledged.

Atlantic

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BREWERY STREET New Haven Connecticut

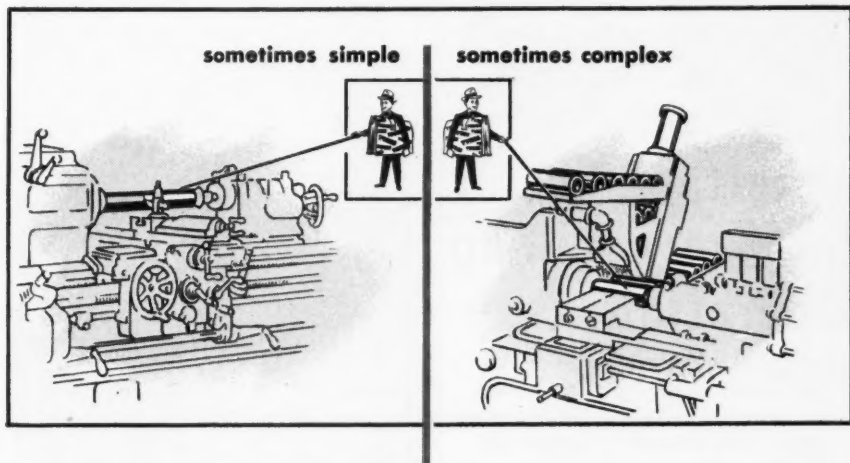
nations will consist either of a large diaphragm opening combined with a short exposure time (as for instance, f-5.6 and 1/200 sec.) or a smaller diaphragm opening and a longer exposure time (as for example, f-22 and 1/10 sec.). It should be noted here, that a large numerical f-stop means a small diaphragm opening (less light is passed onto the film) and vice versa.



The Twin-lens reflex camera is well suited to industrial photography. The negative size of 2 1/4 in. x 2 1/4 in. permits good enlargements. The ground glass viewing surface shows the exact outline of the picture as it is being taken. Illustration courtesy Eastman Kodak Company.

The photographer can now choose between these extremes or any of the combinations between them. His choice will be influenced by the object. If it is in motion, he will select a short shutter time (exposure time) and a large diaphragm opening because a longer shutter time may cause severe blurring because of the moving subject. Should the photograph, however, require a great "depth of field" (sharpness of objects close to the camera as well as sharpness of objects farther in the background) and the objects are

Machinability of Tubing



requiring...

HOT-FINISHED



OR COLD DRAWN



OR ROTO-ROCKED



Much can be said about the comparative machinability of these three types of seamless mechanical tubing. What is best for one user is not always best for another user. For example—B&W is supplying mechanical tubing to three different manufacturers who are producing the same piece of equipment—one from Hot-Finished tubing, the second from Cold-Drawn tubing, and the third from Roto-Rocked tubing. The real criterion for machinability rests with the user and how he is equipped to produce the part.

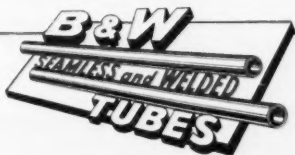
In determining the type to be used in a

specific application attention should also be given to the differences in surface finish, tolerances, and original cost which exist between hot-finished and cold-finished tubing and how these factors affect final production costs.

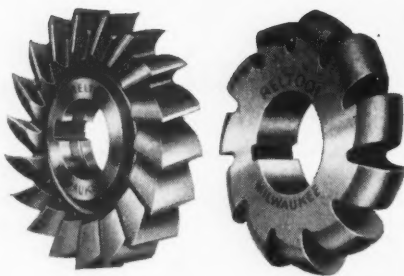
Mr. Tubes—your nearby B&W Tubing Representative—is a good man to consult when you want to match tubing types to your plant facilities and specific jobs... to keep production up and costs down. You'll find B&W Bulletin TB-340, "A Guide to the Use of Seamless Mechanical Tubing", helpful, too. Write for it.

THE BABCOCK & WILCOX COMPANY TUBULAR PRODUCTS DIVISION

Beaver Falls, Pa.—Seamless Tubing; Welded Stainless Steel Tubing
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TA-1718(M)



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Reltool offers a Full Range of Milling Cutters in all Types and Sizes for every standard milling operation, and for many special applications. This includes Keyseat Cutters — both Shank and Arbor Types; Plain and Heavy Duty, Side and Half-Side, Staggered Tooth, Helical, Angle, Shell End, Single- and Double-Angle, T-Slot-Straight and Taper Shank, Dovetail — 45° and 60° Angle. Convex, Concave and Corner Rounding Milling Cutters are available in both the Old Standard and in the New M.C.T.I. Standards.

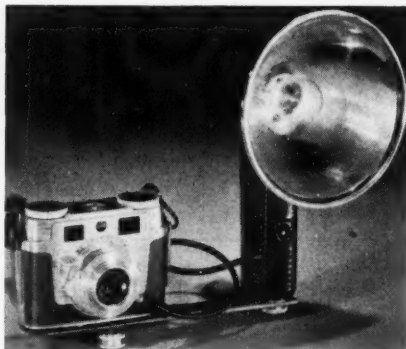
The RELTOOL Line Includes: Combined Drill and Countersinks • Cut-off Blades • Die Sinking Cutters • Dovetail Cutters • End Mills • End Mill Holders • Hollow Mills • Key Seat Cutters • Lathe Centers • Lathe Mandrels • Machine Countersinks • Metal Slitting Saws • Milling Cutters — all types • Screw Slotters • Tool Bits • Specials.



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stationary, he should decide to use a small diaphragm opening and a longer exposure time.

It should be well remembered that a smaller diaphragm opening results in a greater depth of field. In many cases, however, the choice of combination does not matter as long as the proper relationship, as given by the light meter, is followed. The above outline covers the two settings re-



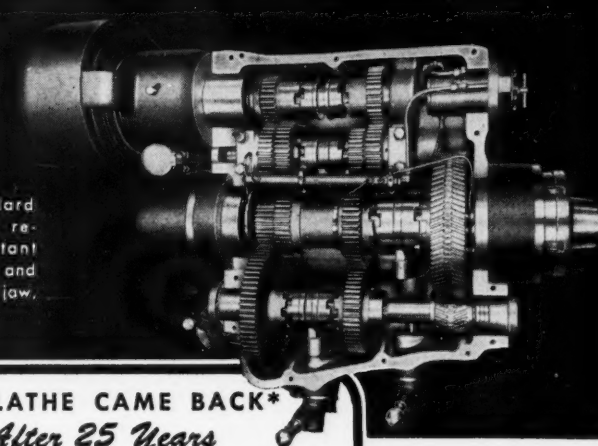
The 35 millimeter camera, with flash attachment, is desirable because of its small physical size and comparative low cost of picture. Illustration courtesy Eastman Kodak Company.

quired to determine correct exposure. The third adjustment of the camera is distance in feet. This can be estimated readily, but if preferred, the camera can be provided with a range finder.

Flash Photography

It may seem unlikely at first impression, but flash photography is actually simpler than photography with natural light. Since the flash bulb gives off a known quantity and intensity of light, a meter is not required and the diaphragm opening can be determined by formula. Since the flash takes only

Boye & Emmes standard headstock with cover removed, showing constant mesh, wide face gears and large diameter, positive jaw, sliding clutches.



THE LATHE CAME BACK*

After 25 Years

HEADSTOCK GEARING "GOOD AS NEW"

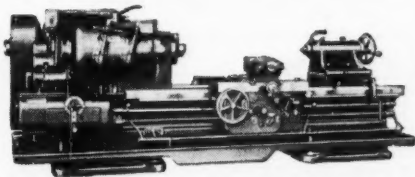
Boye & Emmes Engine Lathe No. 300-141, owned by The Timken Roller Bearing Company, Canton, Ohio, was returned for factory inspection after twenty-five years of day-in-day-out use. During this period,

Timken purchased repair parts from us, for this machine, to the extent of \$154.15. Yet, when the headstock cover was removed at the factory the gearing was found to be "as good as new." This is usual.

CONSTANT MESH GEARS POSITIVE JAW SLIDING CLUTCHES SPELL OUT THE ANSWER

The principle of power transmission which is used in Boye & Emmes Engine Lathes incorporates constant mesh headstock gearing, with speed changes effected through positive jaw, sliding

clutches. This construction eliminates gear wear due to shifting action, allows shorter shafts, less space between bearings, and hence more accurate and rigid construction.



*One of many documented cases of "no wear" in Boye & Emmes constant mesh lathe headstock, after years of use.

FREE LITERATURE

If you are not now using Boye & Emmes Long Life Engine Lathes, investigate. Compare this lathe of low maintenance and high accuracy from every viewpoint. Specifications and details of construction for all sizes are contained in our free Bulletin No. 601. Write for it today!



The three camera settings	Artificial light	Daylight
Distance	Estimate or range finder	Estimate or range finder
f-stop	divide guide number by distance	Light meter
exposure time	1/25 or 1/50 for stationary objects less for moving ones	

Simplified Guide Chart

centage of all common possibilities.

Last, but not least, don't forget to name an assistant for your photographer; he'll act as a stand-in

should your regular photographer be absent when the rush assignment comes. Why not try it yourself?

a very small fraction of a second, the shutter opening time can be preset for stationary objects at 1/25 second or 1/50 second. To determine the f-stop, or diaphragm opening, consult the chart that is printed on the paper cover of each flash bulb container. This chart gives a guide number for each type of film speed, charted against exposure time. Memorize the guide number as you must use it to calculate the diaphragm opening for each picture.

After you have stationed yourself ready to take the picture, estimate the distance between the flash gun and the object, set your camera adjustment to that distance and then, in your head, divide the distance (in feet) into the predetermined guide number. The answer then is the f-stop. Set your camera to the f-stop nearest to the calculated figure and snap the picture.

For the beginner, here is a simplified chart that should cover a great per-



"Kinda thin, isn't it?"

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The WILSON "ROCKWELL" Hardness Tester is a precision instrument with totally enclosed "Zerominder" dial, grips clamp screw for quick change and proper seating of penetrator, conveniently grouped controls, enclosed variable

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There is the WILSON TUKON for micro-indentation hardness testing.

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"ROCKWELL"
and TUKON
Hardness
Testers**

The Foreman and The Lady

By MARTIN SCHAUL*

*Misconceptions about how to handle women account for most failures in supervision of women
--NFI interviews show.*

THE Foreman and The Lady" is not the title of a new Hollywood production starring Ava Gardner and John Wayne; nor is it the latest novel imported from France, but it is the title of an industrial problem in Amer-

ica which is becoming more acute each day; that is, the relationship between the foreman and the women workers. The number of women workers in American industry in 1952 was almost 31 per cent of total people employed.

This is an increase of 2.5 million or 14.7 per cent since the year 1946 when the women left the war factories to go back to home and hearth. The increased defense production and the calling of males from the machines to

the Army continues this increased flow of women into the factories.

The plant managers, personnel men and supervisors who have talked to the field men of The National Foremen's Institute, Inc., leave little doubt that because of this, **the problem of handling women is one of their biggest headaches.** The majority of these men feel that women in the plants did not create problems in themselves but problems arose through bad supervision. As one foreman said, "If you have a crew of women only, there is hardly a problem, or if there is one, it exists because you are a man and you can't get used to some of the peculiarities of the female of the species."

What are the problems that arise when women flood into the plants and factories? Here are a few answers culled from NFI interviews with over 300 management men.

One plant manager said: "My biggest headache so far has been safety. There is no doubt that **women are more prone to accidents than men.** Our first-aid department reports many more injuries reported by the women.



"... the problem of handling women is one of their biggest headaches."

* Editor, "The Foreman's Letter, The National Foremen's Institute, Inc., New London, Conn.

Illustrated by Don Ritchie.

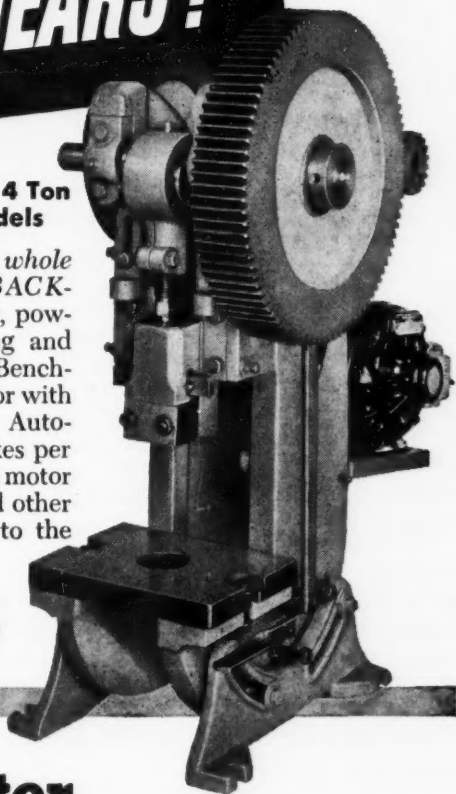
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I found the answer is to make foremen understand that women are liable to be more careless and that they should double safety instruction for women and keep their eyes on the girls' safety habits."

A foreman commented: "In supervising women workers, I have found that above everything else, they must feel they are needed. My suggestion



"... women are more prone to accidents than men."

to a male supervisor of women is to seize every opportunity to make his workers feel they are needed and are important; that they are an integral part of the company employing them. This can be done with a few well-chosen remarks at some opportune time and by the interest he shows in their daily work."

The inevitable problem of the foreman who **also wants to play "wolf"** was put this way by one supervisor: "Too many supervisors believe women enjoy continual "kidding." To perform their best, women must like and respect their boss but they resent undue familiarity, horse-play, or heavy-handed humor."

Another foreman suggested that women can be handled better if treated individually, as each one, he felt, was of a different character. "Above all,"

he said, "be a good listener and a sympathetic one."

The reply of one supervisor came in the form of a fourteen-point program that he drew up from his twenty years of experience in handling women. In the list were these suggestions: don't flatter, don't bawl the girls out in front of others, be pleasant, keep your promises, guard against cliques, don't show favoritism, and your best technique when differences exist among the girls is to be a diplomat.

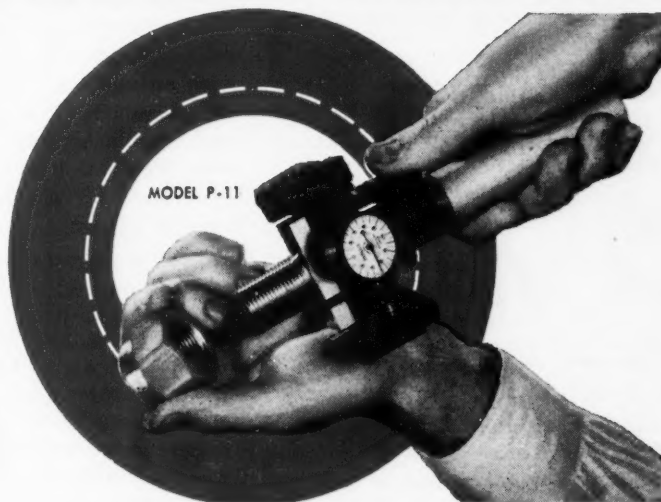
A little bitterness was in the tone of one foreman's voice when he told us of his first experience handling the ladies. He had set up some rather definite rules about talking and, when the girls seemed to ignore them, he immediately blew up. **Right away the girls had him branded as a "sour-puss."** He didn't change his tactics until he pulled two girls off the line one day and gave them a real dressing-down for an infraction of the rules. One of the girls broke into tears while the other



"... problem of the foreman who also wants to play wolf."

gave him a bawling-out in turn. He felt like a heel. When he changed his tune, used a little tact, asked for cooperation, he found that it was readily given.

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The P-11 is a portable comparator gage. A pair of segments, one of which is movable, quickly engage the mating part being inspected. Variation from basic size of P.D., form and lead are shown accumulatively on the dial indicator which reads in .0005". Interchangeable segments inspect all classes of internal threads from 5/16" to 5" dia. Descriptive literature on this gage and other Bryant thread gages is available by sending the coupon.

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"Women are especially sensitive to the physical condition and appearance of the place in which they work." This supervisor's words reminded us of a



"Right away, the girls had him branded as a sour-puss."

classic example of how the women are adversely affected by certain working conditions. A mixed crew of male and female workers were on an assembly line which was illuminated with green lights to make the assembly of multi-colored parts easier on the eyes. The men involved found that the conditions were ideal and helped a great deal in cutting down on the eye fatigue. However, the women suddenly came up with a crop of headaches, nausea, skin eruptions, and various other nervous disorders.

After going into many blind alleys to

find the reasons for this peculiar situation, the foreman on the line found out that the green light dulled the girls' make-up and made them look sallow. When they saw each other in such an unflattering light, it created anxiety about their own appearance, and the illnesses developed. Under a more flattering light, the efficiency of the female workers immediately went back to normal.

There is a general agreement among foremen and supervisors that absenteeism is greater among women than among men. "You never can be sure when the women are going to stay out and slow down production," a personnel manager said. "It is always a headache, or something wrong

with the baby, or even the housework that takes them home."

The fact that American industry uses a large number of married wo-



"You never can be sure when women are going to stay out and thereby slow down production."



Specify Arbor Spacers and Shims

For milling, slitting and gang-saw setups, shimming gears and bearings. Sets in 20 diameters $\frac{1}{8}$ " to 4" . . . 19 graduated thicknesses .001" to .125", specials over .125". Spacers with keyways, shims without. Stocked by Industrial Distributors.



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men (55 per cent of the total women employed as against a 38 per cent in Britain, for example) makes the problem of absenteeism a growing one with an increased female labor force. But, there is little doubt, from our research that misconceptions about how to handle women account for most of the failures in supervision of women. Foremen and supervisors must receive spe-

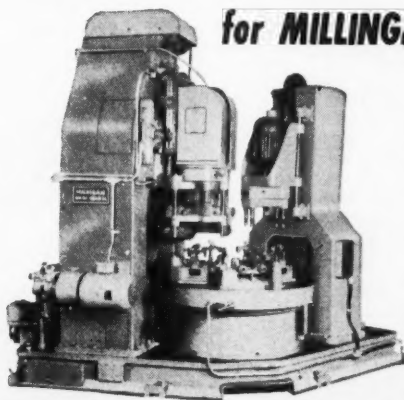
Do's and Don'ts of Supervising Women

Don't—	Do—
bully or nag	show consideration
use profane language	give extra safety instruction
play woff	cut down dirt and noise
play favorites	use tact
reprimand harshly in front of others	treat girls individually
gossip	be a good listener
pay extra attention to the pretty girls	praise often
over-flatter	make them feel wanted
over-criticize	discourage cliques
break promises	keep your head

cial instruction about the difference in their work with women employees before the problem can subside.

This 4-Way SPECIAL MACHINE

for MILLING, DRILLING and TAPPING



is one of the special machines we are constantly building, in addition to our line of MULTIPLE DRILL HEADS, to meet the specific requirements of plants, large and small. . . . So, for your DRILLING, REAMING, TAPPING, SPOT FACING, CHAMFERING, COUNTER-BORING, NUT DRIVING and BORING operations, use Michigan Multiple Equipment and reduce costs, speed production. WRITE, WIRE or PHONE for literature and details.



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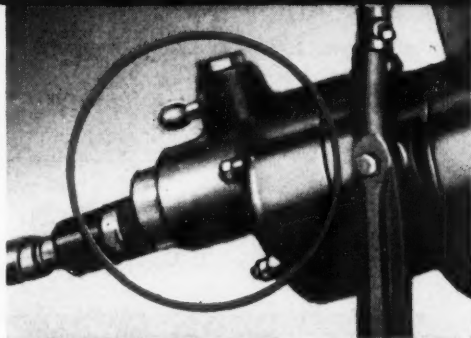
with the **NEW** *Strandflex*

4-SPEED GEAR DRIVE

FLEXIBLE SHAFT MACHINE!

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Strandflex 4-Speed Gear Drive Flexible Shaft Machines are available in $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{1}{2}$ HP and in your choice of two 4-Speed ranges: 850-1800-3600-4500 RPM's or 1700-3600-7200-9000 RPM's. They're built in Bench, Floor or Vertical type units. A complete line of working-head accessories for drilling, grinding, brushing, filing, sanding, buffing and polishing is available . . . all heads are interchangeable on the same shaft. And remember, with *STRAND*, the operator lifts the tool only—not the heavy motor!



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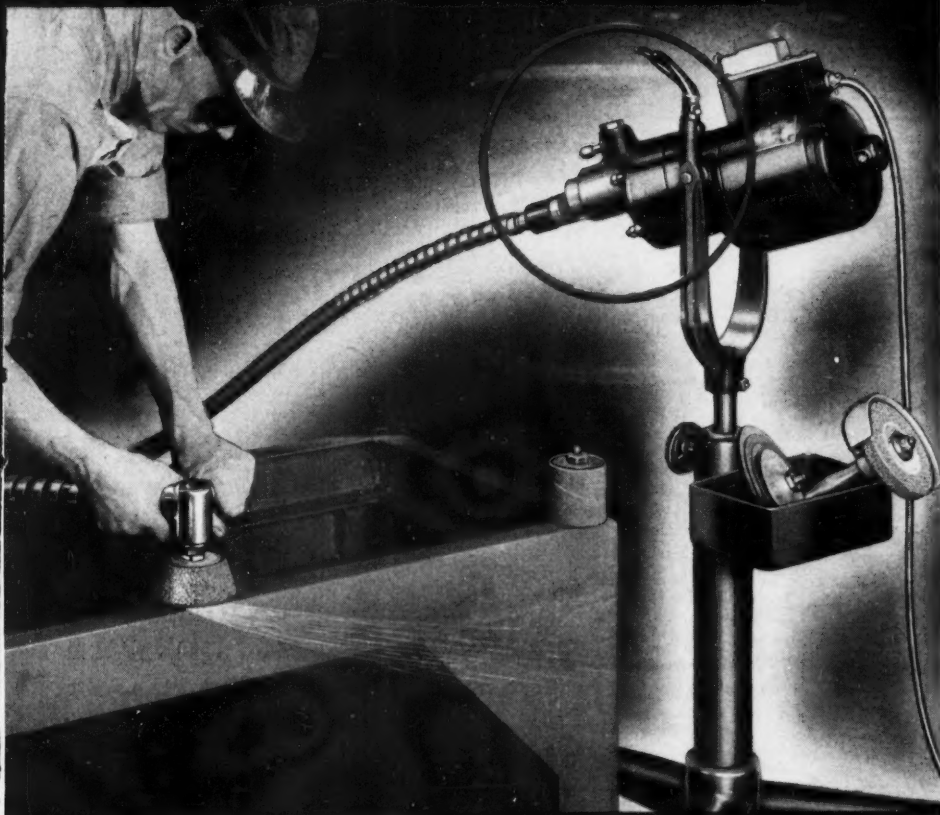
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table to many
tools. Read-
ings to
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Our production engineering department may be able to help you. Write us your problem. Our recommendations and complete catalog showing gages not illustrated will be sent promptly.

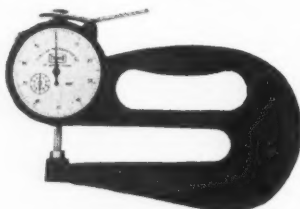


Lever Action
Hand Thick-
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with 1" Throat Depth.
Readings to
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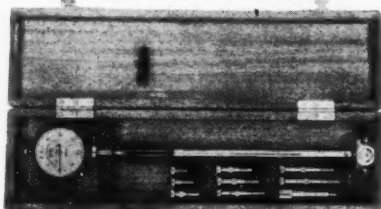
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Dial Bore Depth Gage. Range from 2" to 6" in 10" Bore Depth in 5/10,000ths.



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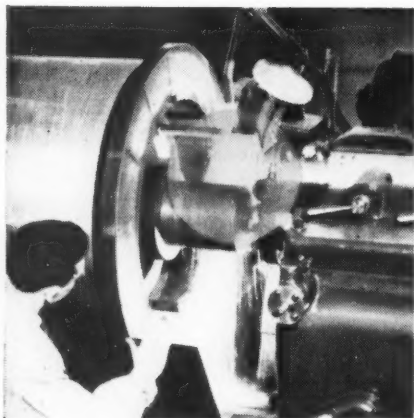
April, 1953

MODERN MACHINE SHOP 217

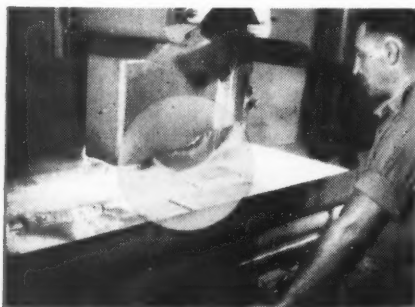
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YOU CAN SEE THE DIFFERENCE. The spark stream from a Norton G Bond ALUNDUM wheel is more continuous, more even, indicating uniformity of wheel structure and of cutting action.

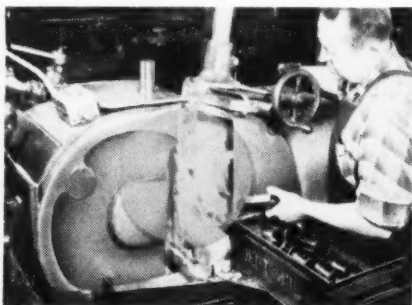


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Secret of the new G Bond's great superiority is the way it holds each abrasive grain for maximum cutting action. Then, *just when it should*, it lets go, assuring a constant grinding surface of new grains with fresh, sharp cutting edges.

As a result, Norton ALUNDUM* grinding wheels made with the new G Bond have definite advantages that you can *see* and *hear* as they



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"TOUCH OF GOLD"

grind — and that are *proved* by the more economical, more profitable work they do.

Make sure you add this new "Touch of Gold" to *your* grinding.

SEE YOUR NORTON DISTRIBUTOR

about arranging a test of one of the new G Bond ALUNDUM wheels in your plant. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

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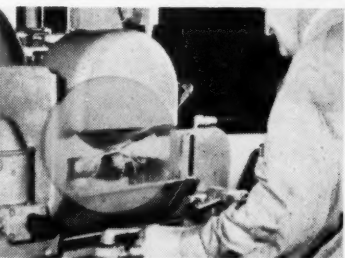
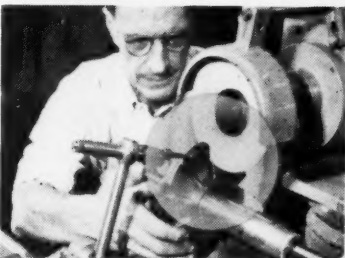
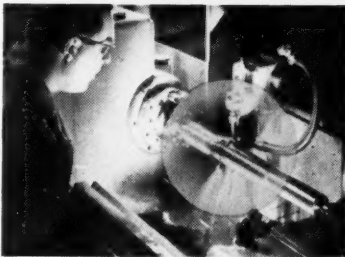
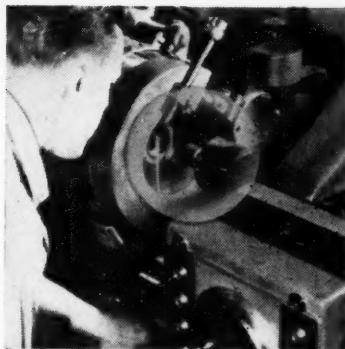
Norton G Bond ALUNDUM wheels:

- Do more work per wheel
- Cut freer, cooler, faster
- Dress easier — more pieces per dressing
- Cover a wider range
- Hold shape — better for form grinding
- Hold corners better
- Ideal for crush dressing

NORTON
ABRASIVES

W-1476

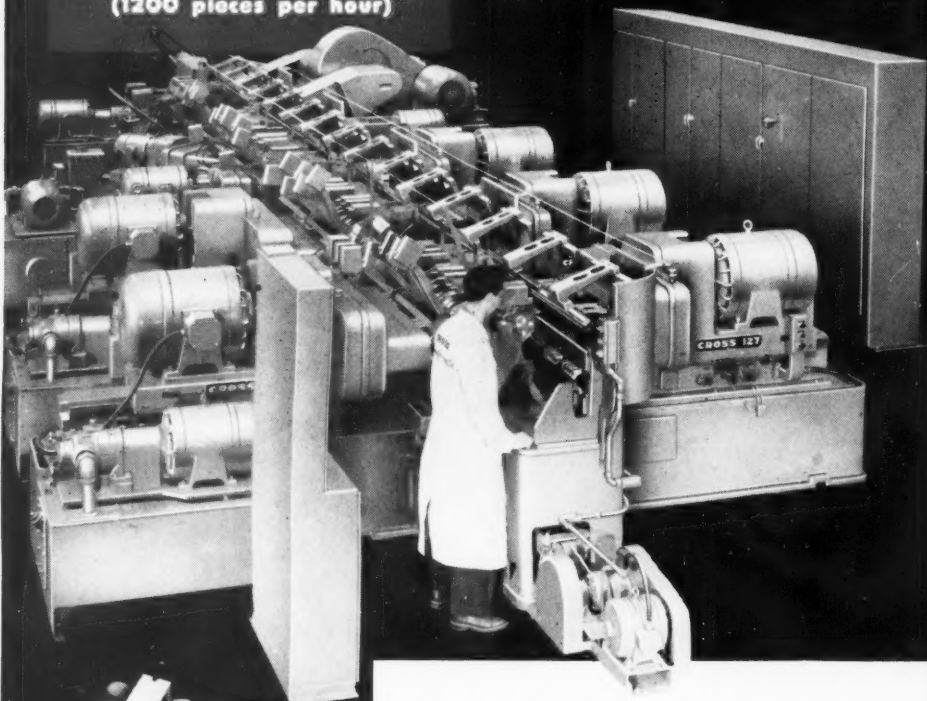
*Making better products
to make other products better*



BROAD USEFULNESS. Norton ALUNDUM wheels in the new G Bond are best for such types of grinding as cylindrical, centerless, surface, internal, gear, tool and cutter, form and thread grinding, and saw gumming.

**Mills, Drills,
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and Taps
Bearing Blocks**
(1200 pieces per hour)

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- ★ Two heavy-duty, 25 hp, vee belt drive, milling spindles for sawing operations.
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Westinghouse Machine Tool Electrification Forum, Statler Hotel, Buffalo, New York.

April 16-17

American Machine Tool Distributors 29th Spring Meeting, Netherland Plaza Hotel, Cincinnati, Ohio.

April 20-23

American Management Association 22nd National Packaging Conference and Exposition, Navy Pier, Chicago, Illinois.

May 20-22

Society for Experimental Stress Analysis Spring Meeting, Hotel Schroeder, Milwaukee, Wisconsin.

May 31-June 3

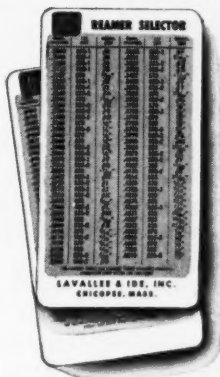
Annual Meeting of the American Gear Manufacturers' Association, The Homestead, Hot Springs, Virginia.

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American Welding Society National Spring Technical Meeting with Welding and Allied Industry Exposition at Shamrock Hotel, Houston, Texas.

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modern equipment at work

Abrasive-Belt Equipped Grinder Speeds Extruded Tube Production

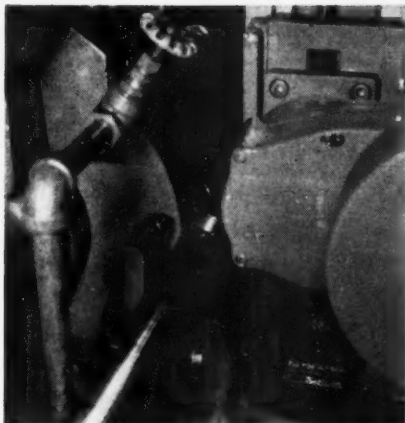
TWO coated abrasive belts are the elements of a new centerless grinder that is said to remove 2 lbs. of stock from a 15-foot length of 2.375-inch o.d. tubing in two minutes. The result of cooperative engineering by the Behr-Manning Corp., Troy, N. Y., and Production Machine Co., Greenfield, Mass., the new process, although adaptable for the fast finishing of cyl-

indrical stock of most materials, was primarily developed for grinding stainless steel and other high alloy tubes produced by the Ugine Sejournet extrusion process, in which the hot steel billet is forced through a Fiberglas lubricated die. Extruded tubing thus produced must be ground to remove the rough surface that results from the high extrusion pressures and to remove taper from the cylindrical stock (up to 0.020 inch per 15-foot length). Stock removal and not surface condition was the major consideration in

finishing the extruded tubing; however, 20 to 30 micro-inch finishes are obtainable using fine grit



▲
Cylindrical stock finished with this centerless grinder is controlled and ground by two coated abrasive belts. Designed for finishing tubing produced by the Ugine-Sejournet extrusion process, the machine removes metal at an unusually fast rate.



Tubing moving into the grinding section of the abrasive belt centerless grinder. With the work rest positioned closer to the grinding belt than to the regulator belt, greater belt pressure is exerted on the work by the regulator belt which therefore controls work feed and rotation.

belts. Tolerances of plus or minus 0.001-inch taper, end to end, are held.

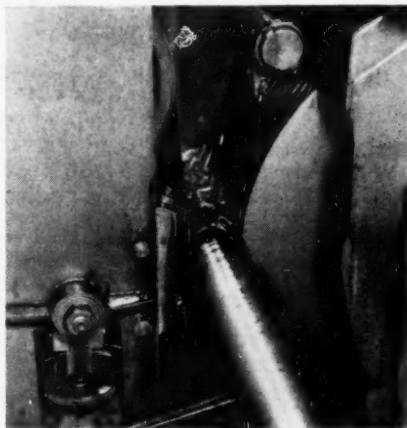
Two coated abrasive belts are used on the machine. A 50 grit aluminum oxide waterproof cloth abrasive belt 9 inches wide and 168 inches long does the grinding. The work is fed past the grinding belt by a 220 grit aluminum oxide waterproof cloth abrasive regulator belt 9 $\frac{1}{4}$ inches wide x 58 inches long. A cutting oil lubricates the grinding belt. Sprayed on the belt by a fan type nozzle, the recirculating lubricant flushes away the grinding swarf and prevents rewelding of the chips.

A steel contact wheel mounted on a 4-inch shaft supports the grinding belt against the work. In addition to backing up the belt, the steel wheel serves as the belt drive pulley. Driven by V-belts from a 25 h.p. electric motor, the

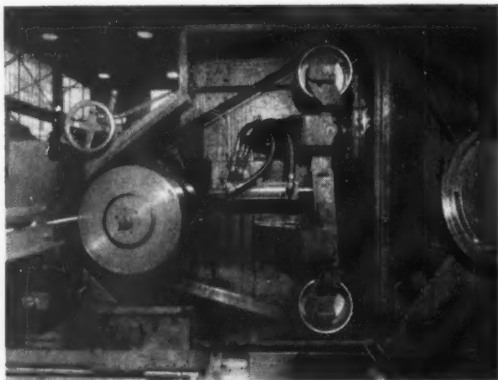
20-inch diameter wheel forces the belt past the work at speeds of 3,500-10,000 s.f.m. It is rigidly mounted in ball bearings to prevent deflection under the very high grinding pressures imposed on it. The steel contact wheel weighs approximately 350 pounds.

The regulator belt assembly consists of the coated abrasive belt, a variable speed drive, an idler pulley, and a flat steel back-up platen which holds the regulator against the work. This entire assembly can be adjusted about a horizontal axis to provide a work feed angle of from 0 to 15 degrees in either direction from the vertical. This angular adjustment, together with the variable speed drive, makes possible an infinitely variable workpiece feed rate from 0 to 30 feet per minute.

The regulator belt, powered by a variable speed drive, controls the ro-



Oil flows from the fan type nozzle above the work onto the abrasive grinding belt. The grinding belt passes over the steel contact wheel at the right and the regulator belt passes over the flat platen at the left. The distance between the belts can be adjusted for tube sizes from 1 to 6 inches in diameter.



Coated abrasive grinding belt passes over a steel contact wheel (at left) and two idler wheels. The lever-mounted idler wheels maintain belt tension. Power to drive the belt is transmitted from a 25 h.p. motor by a multiple V-belt to the contact wheel.

tation of the work against the grinding belt. Control of pressure between workpiece and regulator belt is maintained by placing the work rest closer to the grinding belt than to the regulator belt. The regulator belt is $\frac{3}{4}$ inch wider than the grinding belt. The extra width of the regulator belt is ex-

tended on the infeed side of the machine in order to start the workpiece rotating before it reaches the grinding belt.

By setting a small amount of taper between the contact wheel spindle and the face of the back-up platen, a uniform rate of stock removal is maintained across the entire belt width. As a result of the uniform pressure across the face of the belt, dimensional accuracy is said to be assured throughout belt life.

The main objectives of this method

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TUBE NO.	WT. BEFORE GRINDING	WT. AFTER GRINDING	TOTAL WT. LOSS	PASSES	CONDITIONS OF TEST
1	62 lb. 10 oz.	61 lb. 6 oz.	1 lb. 4 oz.	1	(1) Material Ground "Timken" 52100 steel bars 3 in. o.d. 15-ft. length
2	63 lb. 12 oz.	62 lb. 11 oz.	1 lb. 1 oz.	1	
3	64 lb. 3 oz.	62 lb. 4 oz.	15 oz.	1	
4	63 lb. 6 oz.	62 lb. 6 oz.	1 lb.	1	(2) Machine Production Machine Co. Type 914 Centerless Belt Grinder Contact Wheel—Steel Feed Angle 4½ deg. Stock Feed Rate 14.7 f.p.m. Grinding Speed 5,100 s.f.m. Taper on Platen 0.002 in./in.
5	61 lb. 15 oz.	60 lb. 7 oz.	1 lb. 8 oz.	2	
6	62 lb. 14 oz.	61 lb. 3 oz.	1 lb. 11 oz.	2	
7	62 lb. 9 oz.	60 lb. 15 oz.	1 lb. 10 oz.	2	
8	62 lb. 8 oz.	60 lb. 11 oz.	1 lb. 8 oz.	2	
9	75 lb. 2 oz.	61 lb. 6 oz.	13 lb. 12 oz.	12	
10	72 lb. 13 oz.	60 lb. 11 oz.	12 lb. 2 oz.	11	
11	74 lb. 9 oz.	61 lb.	13 lb. 9 oz.	12	(3) Results (Averages) Stock Removal Rate lb. per pass. 1.1 lb. per min. 1.08 Micro-inch finish. 20 r.m.s.
12	76 lb. 8 oz.	63 lb. 1 oz.	13 lb. 7 oz.	11	
Total figures on one belt			63 lb. 7 oz. and 58 (total wt. loss)	58 (passes)	Belt Used—1 lb. 50 Metalite (Speed Wet) Behr-Manning Corporation

of grinding are: (1) to remove stock from the extruded tubing at a fast rate; (2) to remove the Fiberglas skin and extrusion die marks; (3) to remove the taper from the tubing; and (4) to provide an acceptable finish on the tubing. Tests have demonstrated that the coated abrasive belt grinding process with cutting oil as a lubricant will accomplish these objectives.

Data compiled by the Behr-Manning Products Engineering Department indicate that the coated abrasive belt grinding process is economically practical. The figures on the accompanying chart show results of a series of test runs made using one belt on 12 bars

of Timken 52,100 alloy steel. The belt removed as much stock during the last pass of the twelfth bar as was removed during the first pass of the first bar. Throughout these tests, the work feed angle and rate remained constant.

Because of the rigid construction of the machine and its high ratio of horsepower to belt width (nearly 3 h.p. per inch of belt width), extremely high grinding pressures can be developed. Full advantage is taken of the inherent ability of coated abrasive belts to remove large quantities of stock without overheating the work and causing burning, distortion, and loss of dimensional accuracy.

INGERSOLL'S

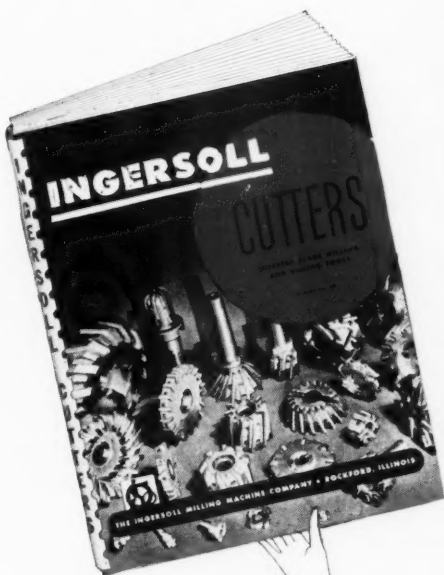
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CUTTER CATALOG

INSERTED BLADE MILLING AND BORING TOOLS

Important recent advances in tool design have made necessary a complete revision of the Ingersoll cutter catalog. The 1953 edition includes extensive material on carbide milling of steel, as well as new information on the proper selection of tools, cutting methods, and cutter grinds for all kinds of work.

Ingersoll cutter designs are constantly being improved to meet requirements of the heavier, faster acting, more powerful machine tools being built today. The knowledge we gain in designing Ingersoll production equipment for a wide variety of work enables us to recommend the proper cutters for all types of machines and materials.



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THE INGERSOLL MILLING MACHINE CO.

ROCKFORD, ILLINOIS



Machine Drills 3,840 Holes Per Hour

A MACHINE which drills 32 holes of $\frac{3}{16}$ -inch diameter in a steel part at the rate of approximately 120 pieces (3,840 holes) per hour has been developed for a customer by the Gov-

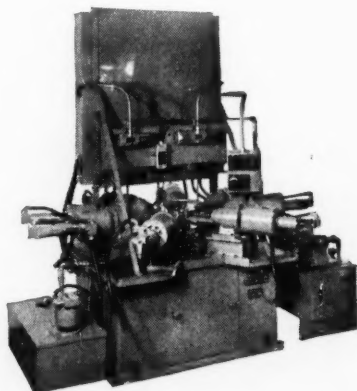
ro-Nelson Co., 1933 Antoinette, Detroit 8, Mich. The machine incorporates eight Model HH automatic drill-



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Sturdy 16 ga. metal.
20" long x 12" wide
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holes and handles at
both ends.

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On this machine, 32 holes of $\frac{3}{16}$ -inch diameter are drilled in a steel part at the rate of approximately 120 pieces (3,840 holes) per hour.

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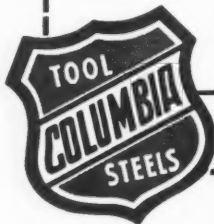
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ing units which are electrically interlocked with automatic, hydraulically operated clamping and indexing.

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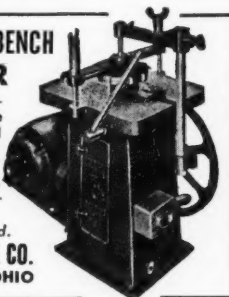
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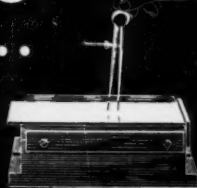
FIXTURES



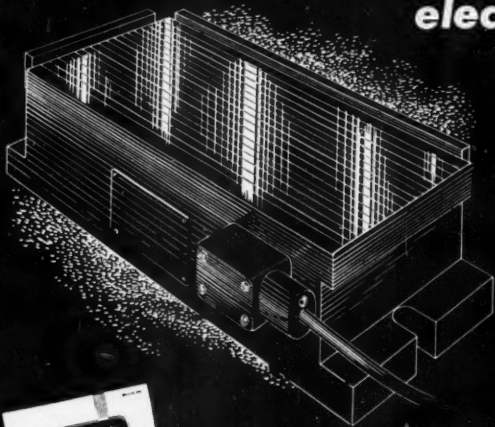
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6 x 18 225.00

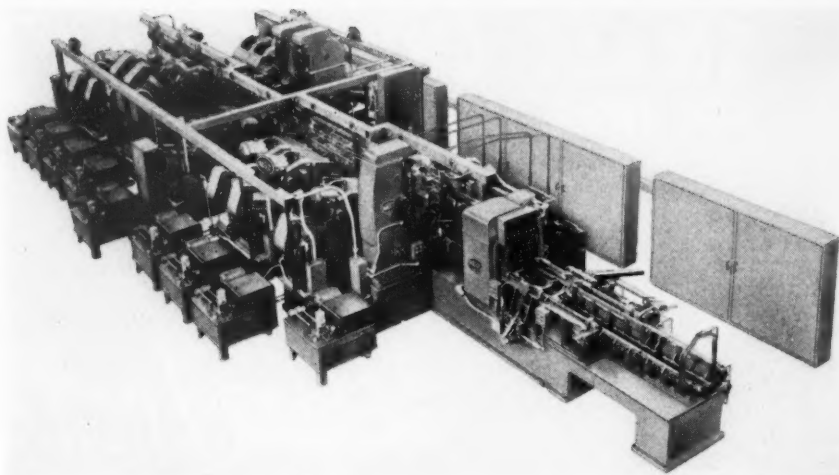
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Magna-Lock

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BIG RAPIDS MICHIGAN, U. S. A.



This large machine was completed recently for use by an automotive manufacturer in performing 55 operations on engine blocks at the rate of approximately two parts per minute.

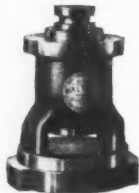
Giant Machine Tool Performs 55 Operations on Engine Blocks

FOR an automotive manufacturer, the National Automatic Tool Co., Richmond, Ind., has completed a large Natco Holeway machine which is capable of completing 55 operations on engine blocks at the rate of nearly two parts per minute. Operations include milling, drilling, combination core drilling and chamfering, reaming, com-

bination spot-facing and chamfering, combination rough counterboring and spot-facing, rotating part 180 degrees and vibrating for chip removal, and also inspecting holes. The machine has 19 stations and requires one operator.

Operations in detail are as follows: (Station 1) load 1 part. (Station 2) right angular head (17 degrees above horizontal), drill 1 hole to $\frac{7}{16}$ -inch diameter part depth; drill 3 holes to $\frac{7}{16}$ -inch diameter part depth; drill 1 hole to $\frac{31}{32}$ -inch diameter part depth.

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(Station 3) right angular head (17 degrees above horizontal), drill 1 hole to $\frac{1}{8}$ -inch diameter additional part depth; drill 3 holes to $\frac{7}{16}$ -inch additional part depth; drill 1 hole to $\frac{1}{8}$ -inch diameter additional part depth. (Station 4) idle. (Station 5) left angular head (45 degrees above horizontal), combination core drill and chamfer 2 holes 1-23/32-inch diameter for 1.750-inch ream; drill 2 holes to $\frac{3}{8}$ -inch di-

ameter for $\frac{1}{8}$ -inch x 14 tap; drill 1 hole to $\frac{1}{8}$ -inch diameter through for $\frac{1}{4}$ N.P.S.F. thread. Right angular head (45 degrees above horizontal), combination core drill and chamfer 2 holes to 1-23/32-inch diameter for 1.750-inch ream; drill 2 holes to $\frac{3}{8}$ -inch diameter for $\frac{1}{8}$ -inch x 14 tap. (Station 6) left angular head (45 degrees above horizontal), ream 2 holes to 1.750-inch diameter; combination spot-face and

chamfer 2 holes to size. Right angular head (45 degrees above horizontal), ream 2 holes to 1.750-inch diameter; combination spot-face and chamfer 2 holes to size. (Station 7) idle. (Station 8) left angular head (angle off vertical), drill 1 hole to $\frac{1}{4}$ -inch diameter $\frac{1}{2}$ depth. Right angular head (17 degrees above horizontal), combination rough counter-bore for 4.94-inch finish diameter and spot-face 1 $\frac{1}{8}$ -inch diameter bolt boss. (Station 9) left angular head (angle off vertical), drill 1 hole to $\frac{1}{4}$ -inch diameter through. Right angular head (17 degrees above

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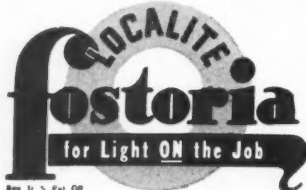
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horizontal), finish counterbore 1 hole to 4.94-inch diameter. (Station 10) idle. (Station 11) right angular head (17 degrees above horizontal), drill 4 holes to 11/32-inch diameter additional part depth; drill 1 hole to 11/32-inch diameter additional part depth; drill 1 hole to 1/8-inch diameter 0.24-inch depth. (Station 12) right angular head (17 degrees above horizontal),

drill 4 holes to 11/32-inch diameter additional part depth; drill 1 hole to 11/32-inch diameter additional part depth; drill 1 hole to 3/16-inch diameter 0.46-inch depth. (Station 13) idle. (Station 14) right angular head (17 degrees above horizontal), drill 4 holes to 11/32-inch diameter to depth; drill 1 hole to 11/32-inch diameter to depth. (Station 15) right vertical head, mill

4 - inch diameter around hole for oil breather tube. (Station 16) idle. (Station 17) rotate part 180 degrees; vibrate while rotating from pan face up to pan face down front end leading. (Station 18) left side (17 degrees below horizontal), inspect holes to be tapped for drill through and depth 5 holes (45 degrees below horizontal); inspect holes to be tapped for drill through and depth 2 holes. Right side (45 degrees below horizontal), inspect holes to be tapped for drill through and depth 3 holes. (Station 19) unload oil pan face down front end leading.



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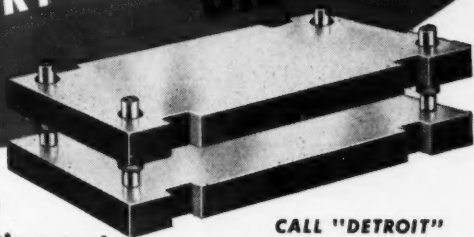
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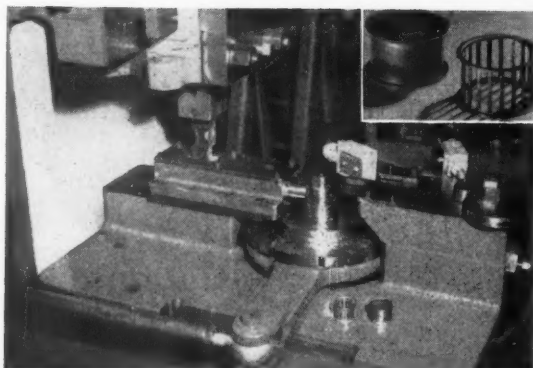
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Close-up view of V & O power press equipped with special fixture to pierce needle bearing cages of the type shown in the inset. The press is arranged to punch in a horizontal direction.

Power Press Equipped with Special Fixture Pierces Needle Bearing Cages

EQUIPPED with a special fixture, a power press has been built by the V & O Press Co., Division of Emhart Mfg. Co., Hudson, N. Y., to pierce

long, in bronze tubing 0.025 inch thick.

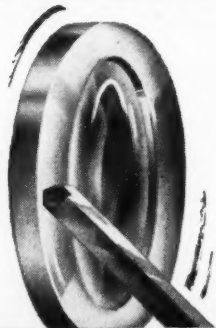
As shown in the illustration, the machine punches in a horizontal direction. The tubing blank is placed over a die where it is automatically pierced and indexed for the successive slots. When the 19 piercings are completed, the machine stops automatically.

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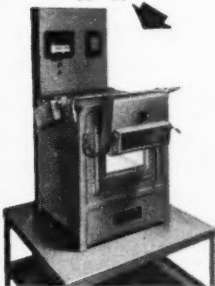
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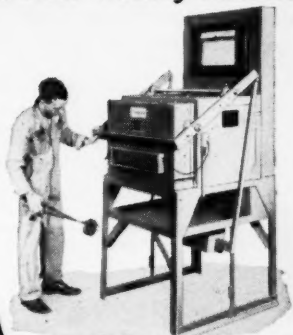
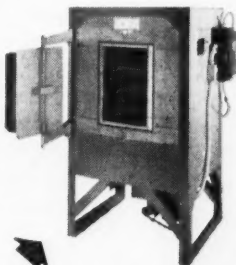
A special Cooley feature is a package unit comprised of furnace and integrally wired control panel, incorporating pyrometer, line switch and fuses—all completely factory wired.

Indicating controlling Pyrometers are available with all Cooley Furnaces.

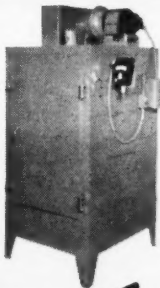
Bench Type — For tools and small parts — to 2000°F 14 models and sizes to 10" w x 8" h x 18" d.



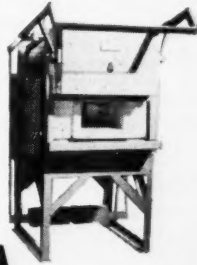
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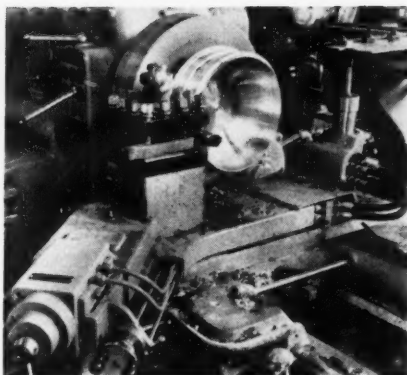
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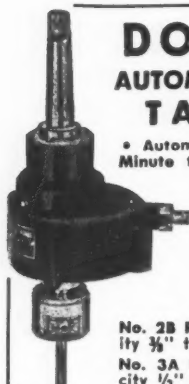
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Duplicating Attachment Simplifies Machining of Guided Missile Parts

THE machining of difficult contours for guided missile parts at Rheem Mfg. Co., Downey, Calif., has been simplified by equipping standard lathes with Turchan Followers, requiring only 68 minutes to complete the part as compared to the 3 hours previously



Preparatory cuts taken with roughing tool on outside diameter of guided missile part match inside diameter to exacting dimensions. Stylus and template can be seen in foreground with tracer valve.



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needed. In turning the inside and outside diameters of these air tank heads, 23 lb. of stock at 12-inch diameter must be removed from rough forgings of 4130 aircraft steel. This is accomplished with $\pm .005/-.000$ tolerances.

A full spherical radius has to be cut inside. The contour starts straight, blends into a $2\frac{3}{4}$ -inch radius and blends again into an 8-inch spherical radius.

With the Turchan duplicating attachment, a stylus point follows the template to guide the tool by power cross feed, reproducing the exact contour on



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Waldes Truarc Internal Grooving Tool

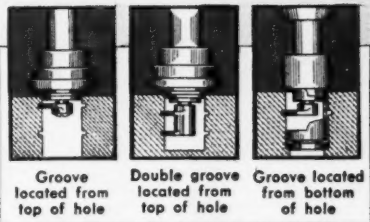
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in bores and housings

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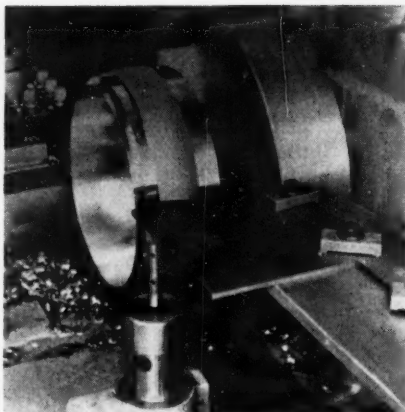
Title

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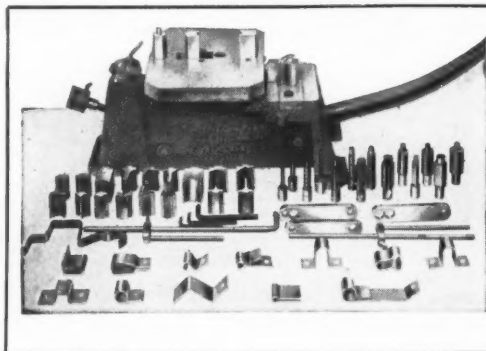
the part. The ease of setup and simplicity of tooling with this attachment provides many advantages, including the use of conventional tools which produce smooth high quality surface finishes. The finish tool for making the final cut requires no adjustment for size from rough to finish as tools are set in proper relation. Facing to length,



Finishing o.d. of guided missile part. No adjustment is required for size when changing from rough to finish, as tools are set in proper relation. Job is accomplished in 68 minutes by duplicating method; conventional manner required 3 hours.

inside bore and radius to center line are all controlled by the template and first size setting when the setup is made. Calipering is confined to the first diameter only, with subsequent diameters obtained automatically.

The duplicating attachment as manufactured by Turchan Follower Machine Co., Detroit 4, Mich., is designed to meet any combination of the lathe's feeds, speeds, and tooling.



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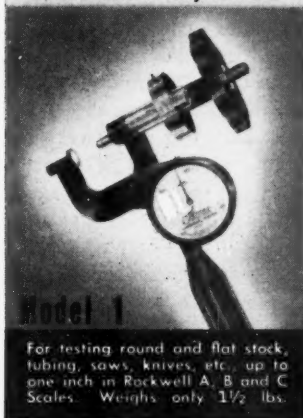
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Power Brushing Increases Diamond Wheel Cutting Action by 80 Per Cent

A BRUSHING method that is claimed to increase the cutting action of used diamond wheels by 80 per cent is now in use at the S. K. Wellman Co., Cleveland, Ohio. This method, worked out by Wellman engineers in collaboration with The Osborn Mfg. Co., 5401

Hamilton Ave., Cleveland 14, Ohio, involves the use of a wire brush to remove some of the brass matrix, leaving the industrial diamonds sticking up for better cutting action and thereby affording each wheel greatly increased life.

Diamond wheels are employed at Wellman to cut grooves in silicon alloy material used for Wellman "Velve-touch" clutch plates, such as shown in

Fig. 1. Various sizes of wheels are used: 3-inch diameter x $\frac{1}{8}$ and $\frac{1}{4}$ -inch thick. The outer rim of each wheel consists of a $\frac{1}{8}$ or $\frac{1}{4}$ -inch thickness of industrial diamonds bonded in brass matrix.

Under ordinary service conditions, wheels are inclined to wear down to a crown shape and must be squared up or "trued" and "dressed." "Truing" is a process of restoring the cutting face of a wheel to running truth. "Dressing" is done for the purpose of improving the wheel's cutting action. Dressing the wheel is primarily a cleaning or "resharpening"

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operation which removes any load or a minute amount of bond between the diamond particles. This particular job is performed with the aid of Osborn wire wheel brushes.

In truing or squaring up the diamond wheels, a brake-controlled truing device is used. Two wheels are trued at the same time, as shown in Fig. 2. While the diamond wheels ro-

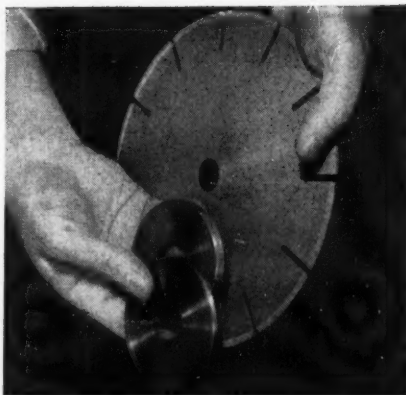


Fig. 1—Diamond wheels of various sizes are employed at Wellman for cutting grooves in silicon alloy material used for clutch plates. The diamonds in each wheel are bonded in brass matrix.

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tate, the rotating grinding wheel is passed back and forth across their faces. As much as 30 minutes of grinding is done, with approximately 1/32 of each diamond wheel taken off, depending on the amount of truing necessary.

When the surfaces of both diamond wheels are uniform and there is no visible parting line between the two wheels, the operator estimates that the wheels are squared up. The wheels are then dressed with an 8-inch Osborn wire brush, as shown in Fig. 3. Both the brush and the diamond wheels ro-

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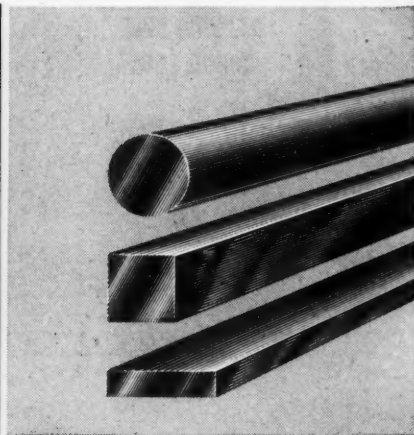
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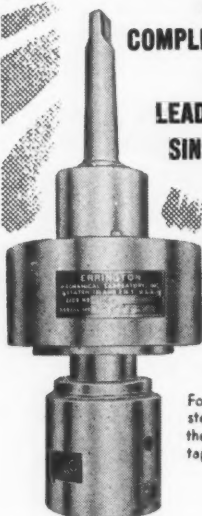
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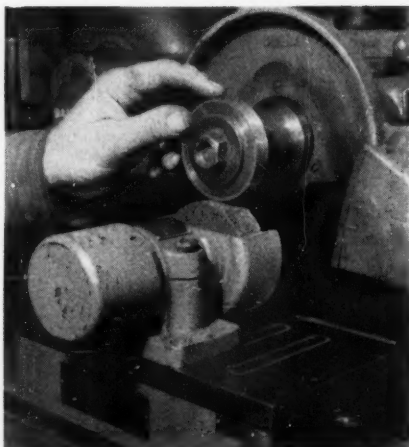
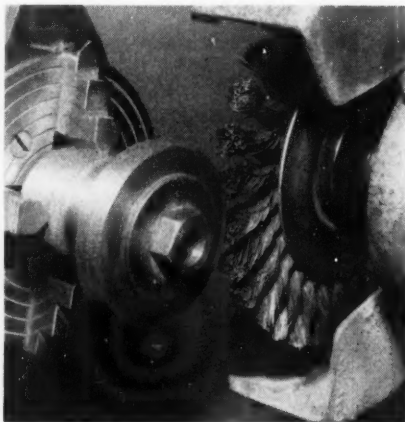


Fig. 2—Truing the wheel is a process of restoring the wheel to running truth. Two diamond wheels are trued at the same time, pancaked together.

tate at 3,600 revolutions per minute. The object of the dressing operation is to remove some of the brass matrix, leaving the diamonds sticking up for better cutting action.

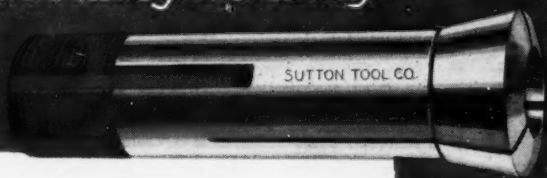
Fig. 3—The wheels are dressed by Osborn brushes. The brushes remove some of the brass matrix, leaving the diamonds sticking up for better cutting action.



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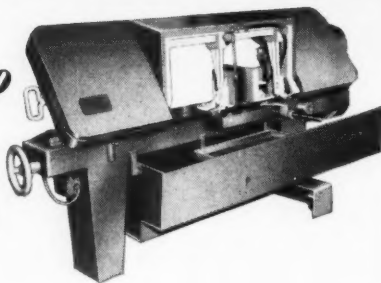
Carbide Tooling Affords Increased Tool Life on Severe Interrupted Cuts

INCREASED tool life up to 1,150 per cent is enabling many operators to show reduced machining costs in instances of severe interrupted cutting, according to information released by Kennametal, Inc., Latrobe, Pa. An agricultural equipment producer overcame such a cutting problem in rough

turning his cast iron corn-husker rolls with Kennametal K-6 clamped-on-tip cemented tungsten carbide tools on a 10 h.p. lathe. These rolls, which contain many hard spots and sandy inclusions, have numerous grooves on their long slender bodies which present unusually severe interrupted cutting conditions. The terrific pounding set up by these interruptions causes the 3¼-inch diameter x 67-inch long rolls to vibrate and bounce to such a

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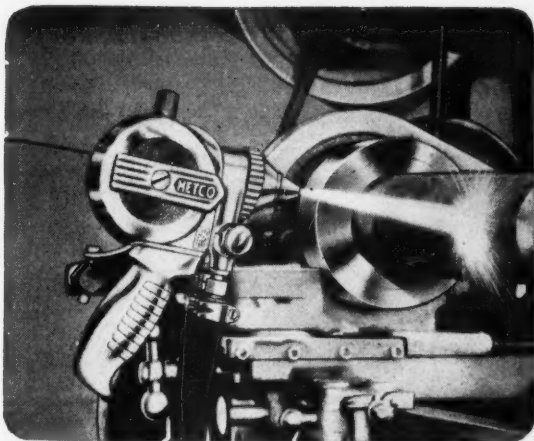
MACHINE TOOL DIVISION

Kalamazoo TANK and SILO CO.

410 HARRISON ST., KALAMAZOO, MICHIGAN

degree that the cross slide feed handle has to be fastened down with a C-clamp to prevent creepage. A roller steady rest was attached to the cross slide to support the workpiece. However, this helped very little since it bounced along with the cross slide at each interruption.

Initially, this operation was performed with tools which required regrinding after turning only three pieces. In an attempt to reduce frequent tool changes and increase production, Kennametal cemented tungsten-carbide tools were applied to the



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New, low, compressed-air requirements... only 10 cfm at 40 to 60 psi, already available in many shops, or supplied by inexpensive 3 hp compressor... bring metallizing within reach of the small user.

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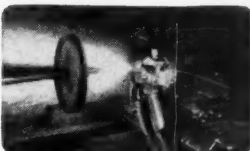
It's Versatile—Use the L-Gun machine-mounted or hand-held—it weighs only 4 lb. 2 oz. Do all kinds of metallizing work—shaft and bore build-up with harder, longer wearing metals; build up worn pump plungers, crankshafts, motor shafts; apply corrosion-resistant coatings. There are hundreds of different jobs that are "naturals" for metallizing.*

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Free Bulletin or Shop Demonstration—Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own. No obligation, of course.



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Building up worn brake-drum



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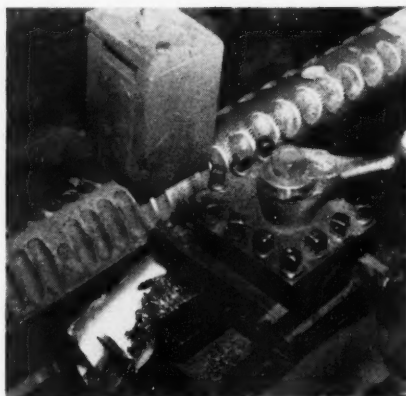
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job. Despite the severe operating conditions, the tools turned 350 pieces before any regrinding was required, representing 115 times greater tool life.

The first tool tried on the job was a Kennametal standard brazed-on-tip type. To prevent breakage occasioned by the severe interruptions, it was found necessary to modify the tool as follows: (1) increase back rake to 15



Turning cast iron husker rolls (severe interruptions) with Kennametal clamped tool Grade K6. Previously-used tool averaged only three pieces per regrind. Kennametal tool averaged 350 pieces per regrind.



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★ COLLIS Equipment fills today's important production needs so well because they are made by men skilled in making this type of equipment. Supply the proper unit from a complete range of types and sizes for Drill Sleeves and Sockets, Lathe Centers, Chuck Arbors, and Drill Drifts. We will handle your orders promptly.

THE COLLIS COMPANY
DEPT. A, CLINTON, IOWA

degrees negative, (2) change the end cutting-edge angle to 30 degrees, and (3) increase the nose radius to $\frac{1}{8}$ inch. This tool averaged about 350 pieces per grind. What little breakage resulted was due to inherent brazing strains aggravated by the severe interruptions.

To correct this condition, a Kennametal clamped-on-tip tool with similar modification was applied. With its thermal-strain-free assembly, it eliminated breakage and continued to produce 350 pieces per grind. This extended life reduced tool grinding by approximately 99 per cent.

After changing to cemented tungsten carbide tools, revolutions and surface feet per minute were doubled to 80 and 78.5, respectively. Feed was increased from 0.030 to 0.044 inch with depth of cut remaining the same at $\frac{1}{8}$ to $\frac{1}{4}$ inch. Turning time per piece was reduced from 39 to 15 minutes, and 16 pieces were produced per 8-hour shift as compared to 11 previously.

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TWIST of the WRIST

TOOL UP WITH
**CONTINENTAL
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With Continental Standard Drive Holders you can change cutters with a twist of the wrist no matter how severe the operation has been. This will save you time and save your tools.

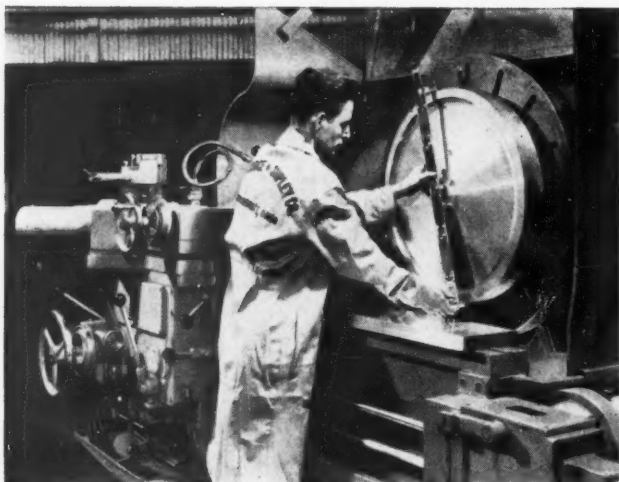
It is as simple as this: The Continental Standard Drive consists of integral double driving lugs on the shank of the cutter which engage double abutments in the socket of the holder. Double aligning bearings keep the cutter and holder in rigid alignment. The drive is machined from the solid—there are no pins or loose details. Result—a balanced, positive drive which is non-wedging and practically indestructible.

Order through your Ex-Cell-O representative or direct from the Continental Tool Works in Detroit.



Continental Counterbores may be purchased individually or in sets. Write on your company letterhead for Catalog 60681.





Operator of a Lodge & Shipley T-lathe is shown checking a large diameter jet engine part using Webber eccentric clamp type gage blocks.

Large Dimension Inspection with Gage Blocks

THE T-lathe introduced recently by The Lodge & Shipley Co., Cincinnati 25, Ohio, permits easy accessibility to the work and provides sufficient bed clearance to turn work of comparatively large diameter and short length, such as jet engine parts. Linear inspection of these parts can be made without removing the work from the machine by the use of oversize gage blocks, such as heavy duty blocks made by Webber Gage Co., 12899 Tris-

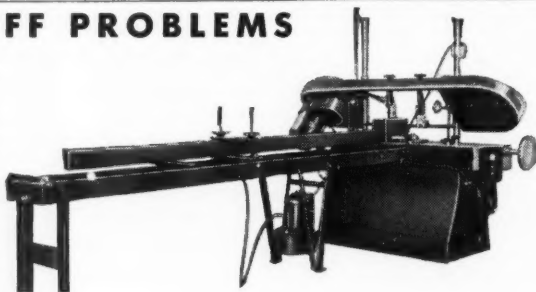
are held together with eccentric clamps, providing a rigid build-up without excessive pressure. The slight compression of each gage block at either end is offset by a counteracting pull on the mid-section. Thus, an accuracy of ± 0.000005 inch is said to be carefully maintained over the entire gage block assembly.

Designed to measure work of practically any size, the gage blocks are provided in sets complete with clamps, holders, scribes, base, center point, and jaws for a wide variety of applications.

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OVER 20,000 and Still Going Strong

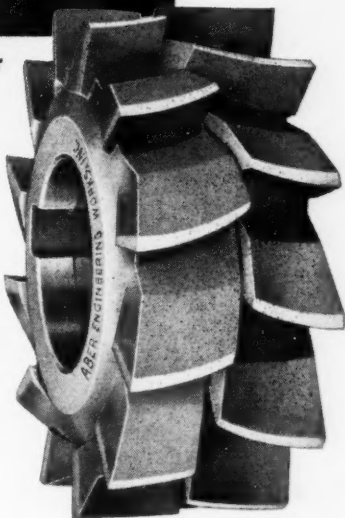
...With An Aber Curved Tooth Milling Cutter

Objectional chatter marks from standard type cutters surprisingly resulted in increasing production from 4,000 to 20,000 pieces per grind

Eight months ago a manufacturer experienced difficulty in obtaining a smooth surface on a side milling operation while using standard type cutters.

Aber "Curved Tooth" right and left hand shear side milling cutters were recommended to eliminate chatter marks. NO THOUGHT WAS GIVEN TO INCREASING PRODUCTION.

The results proved outstanding — After eight months of continuous operation, without once removing the cutters from the machine, Aber "Curved Tooth" cutters produced 20,000 pieces against previous peak outputs ranging between 3,000 and 4,000. In addition the cutters are still producing pieces within specified tolerances and with a finish finer than that obtainable with NEW standard type cutters.



Here Are the Facts

OPERATION DATA

MACHINE: U. S. Multimiller

TOOL: Aber "Curved Tooth" right and left hand shear side milling cutter. 3" x 5/8" x 1 1/4"

MATERIAL: Bronze Turbine Blades.

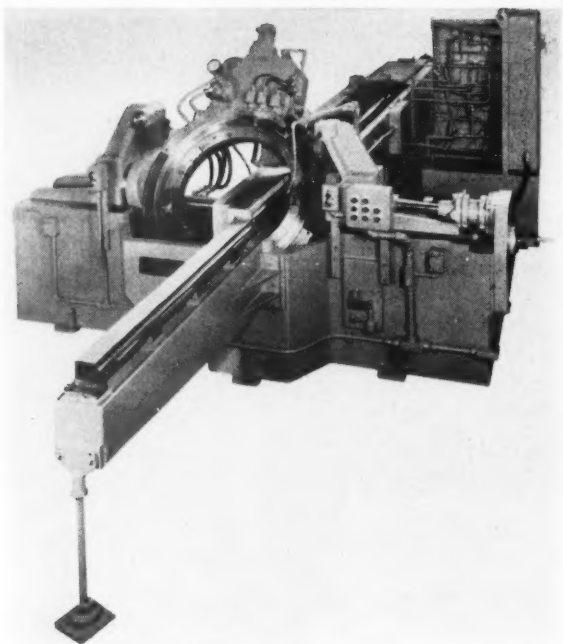
COMPARATIVE PERFORMANCE

	ABER CUTTER	STANDARD CUTTERS
S. F. M. Speed:	400sfm	400sfm
Feed per Rev.:	16" per min.	12" per min.
Depth of Cut:	3/4"	3/4"
Pieces per Grind:	20,000 and still going strong	3,000 to 4,000 maximum

You too can profit by applying Aber "Curved Tooth" milling cutters for increased production and reduced rejections due to off-tolerance, unsatisfactory finish milling operations. Remember every Aber Tool has the exclusive, patented "Curved Tooth" design providing chatterless, smooth cutting action.

ABER
ENGINEERING WORKS INC.
WATERFORD, WISCONSIN





Colonial horizontal broaching machine equipped with special trunnion fixture for internal broaching of slots in jet engine ring segments

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HIGH versatility is a feature of a special trunnion fixture-equipped horizontal broaching machine develop-

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An internally mounted rotor in the trunnion fixture is actuated by an index mechanism mounted on top of the fixture. This arrangement allows the workpiece to be advanced in accurate increments in accordance with the workpiece specifications. Angular ad-

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For full information write for Bulletin SE-130

CADILLAC STAMP CO.

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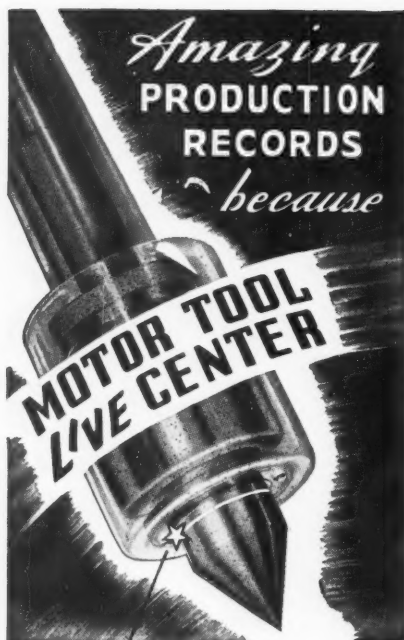
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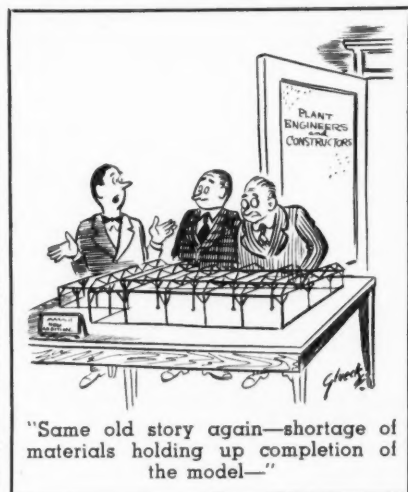
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justment is effected through a worm and segment, with positive locking. Indexing is hydraulically powered through change gears and a Geneva motion (controlled by limit switches) and locked in place by a positive plunger, providing high versatility as to amount of index.

In operation, the ring segment is mounted in the fixture, the trunnion fixture is horizontally shuttled into broaching position, and the broach cuts a slot. The fixture recedes from the broach cut, the broach is returned, and the part is indexed one increment. The fixture then returns to broaching position, and the process is repeated automatically until all slots are broached. The rapid traverse then rotates the part automatically to loading and unloading position. The part is ejected pneumatically. Selective electrical circuits are provided for fully automatic operation, single indexing, or independent inching motions for all hydraulic units, including both forward and reverse.



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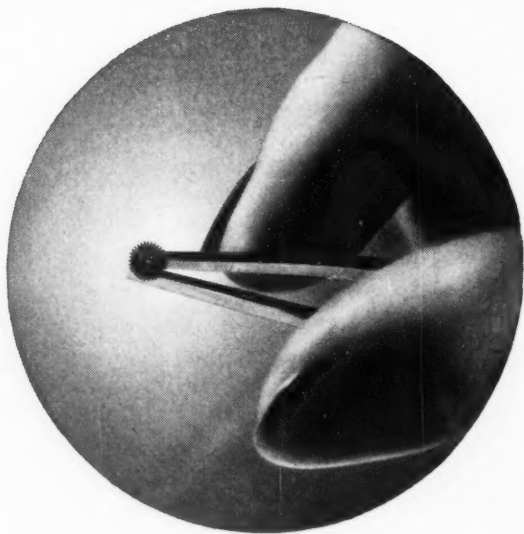
2807 W. FORT ST.

DETROIT 16, MICH.

April, 1953

MODERN MACHINE SHOP 257

Hour wheel, .140" diameter with 32 teeth, hobbed with a Barber-Colman special fine pitch hob. Thickness of teeth may not vary more than .0003" on each wheel.



PRODUCTION HOBGING OF PRECISION FINE PITCH GEARS *Up to 270 Diametral Pitch*

The high production of accurate fine-pitch gears is a development of Barber-Colman Company. Special techniques have been developed for the manufacture of hobs as fine as 270 D.P. Fine-pitch hobs can be furnished from Class AA to Class C to meet your specific accuracy requirements. Multithread hobs are available for maximum production. In addition to hobs, Barber-Colman makes the machines to hob these fine-pitch gears. Most of these gears are cut on the No. 1-1/2 and No. 6-10 Hobbing Machines, but the Precision No. 6-10 is used for maximum accuracy.

As far back as 1936, Barber-Colman Engineers were making hobs and machines for cutting gears as small as 1/8" diameter and with teeth as fine as 160 D.P. Continuous development since this time has resulted in standard production techniques for gears up to 270 diametral pitch. Unground hobs are available to 270 D.P., ground hobs to 200 D.P., and carbide-tipped hobs to 150 D.P. Such tolerances as .0003" total composite error and .0002" tooth-to-tooth composite error are possible on gears of the finer pitches.

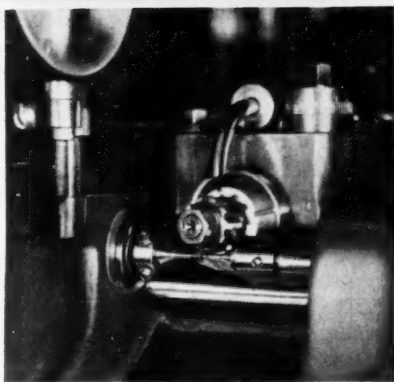
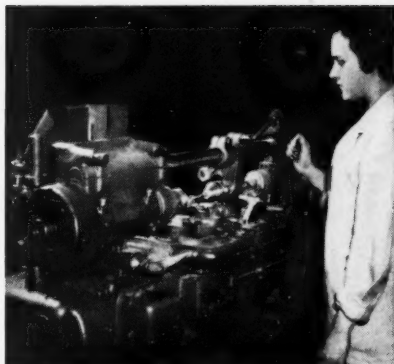
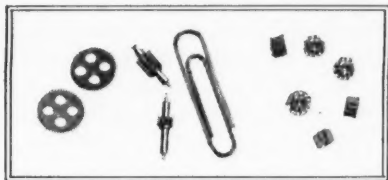
B U I L D E R S O F P R E C I S I O N G E A R

120 D.P. Instrument Gears

Typical of the range of fine pitch work in the plant of a large precision instrument maker, this hobbing job requires a good grade of commercial gear on a high volume basis. A battery of three Barber-Colman No. 6-10 Hobbing Machines produces 6000 gears per hour with 50 blanks mounted on an arbor. Close tolerances are consistently maintained at this rate of production. Fast loading and unloading is accomplished with air-operated tooling equipment. Here are the specifications: 50-tooth Spur Gears, 120 D.P., .422" O.D., .030" face in brass. Hob — $1\frac{1}{8}$ " x 1" x $\frac{1}{2}$ ", Ground Multithread. Feed per revolution of work .020"; Hob Speed 1200 rpm.

180 D.P. Pinions

On another job, precision small pinions, .111" O.D. x .086" face, 18-tooth, 180-pitch are hand loaded and hobbled within a tolerance of .0003" on the pitch diameter on the No. 1- $\frac{1}{2}$ Hobbing Machine. Since extra fine finish is required a feed of .012" per revolution of work is used with an hourly production of 270 gears. Hob speed is 1795 rpm. A Barber-Colman ground hob, $\frac{3}{4}$ " O.D. x $\frac{1}{2}$ " x .315", averages 850 pinions between sharpenings. Special tooling for magazine loading of the No. 1- $\frac{1}{2}$ machine is available as extra equipment.



When you require small gears, in pitches up to 270 D.P. in high volume production with close limits of tooth accuracy, call your Barber-Colman representative for assistance. With the precision and engineering built into Barber-Colman Hobs and Machines, he can help you reduce such problems to ordinary gear cutting procedure.

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H O B S A N D M A C H I N E S S I N C E 1 9 1 1

ideas from readers

Special Lathe Arbor Fixture for Compressor Eccentric Shaft Wedge

By IRA S. ROBERTS

WHEN performing any type of machining operation, if the work-holding fixture can be designed to accommodate more than one piece, the production cost per unit is reduced. The time required for locating and holding the workpiece and also for removing the finished machined part is lost or unproductive time. It is, therefore, wise and efficient tool designing

to make any special production tool with the lost time as small a percentage of the total time as possible or practical.

Figure 1 shows an eccentric shaft wedge made from a steel forging which is one of the details used on the air compressors built by the Gardner-Denver Co., Quincy, Ill. In producing this part, the forging is first rough milled on the two sides and the bottom of the 2½-inch channel, leaving 1/64 inch on each surface for finish. This channel is then broached to size, including the 3½-degree taper, on a horizontal broaching machine. The

next operation consists of drilling and tapping the ½-inch 13-thread hole. The following work performed on the forging includes machining the outside circular surface which consists of turning and finish grinding opera-

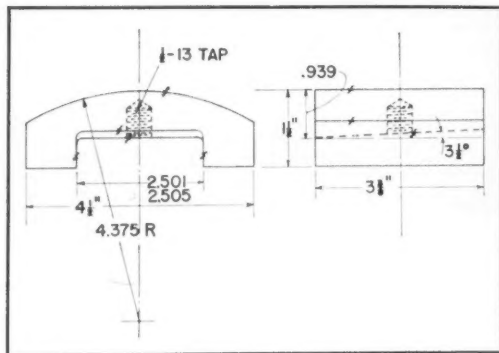
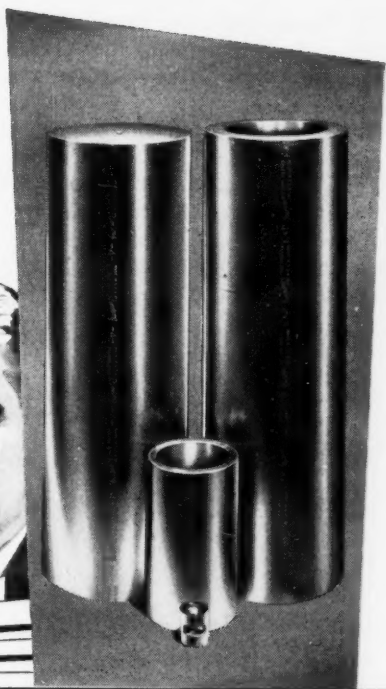


Fig. 1—Sketch of air compressor eccentric shaft wedge, turned and finish ground with the aid of the lathe arbor fixture shown in Fig. 2.

They

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April, 1953

MODERN MACHINE SHOP 261

tions. The special arbor fixture used in holding the work during the performance of these latter operations is shown in Fig. 2.

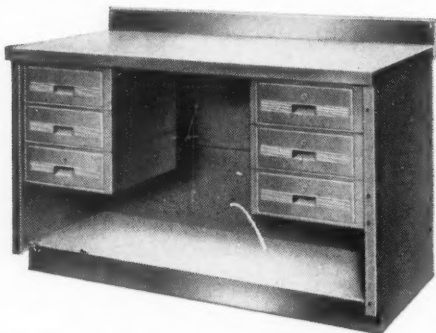
The fixture is made with a machine steel plate $5\frac{5}{8} \times 5\frac{5}{8} \times 1\frac{1}{4}$ inches thick to form the body, **A**. Four openings are cut in the body in the positions shown, and machine steel blocks, **B**, are welded to the four ends of the body. As a support for these blocks, 16 machine

steel ribs, **C**, are provided, these ribs being welded into position in such a manner as to connect the body **A** with the blocks **B**. Through a 2-inch machined hole in the body is placed a machine steel shaft, **E**, which is fastened and supported by means of eight steel ribs, **D**, that are welded to the shaft and body. Four $33/64$ -inch holes are then drilled in the center of the blocks **B**. The assembled arbor is next machined on the surfaces marked "f."

It will be noticed that the blocks **B** are machined to provide a close sliding fit in the $2\frac{1}{2}$ -inch broached channel in the work piece and also that the end surfaces of the blocks are provided with a $3\frac{1}{2}$ -degree taper to suit the angle surface produced with the broach in the channel.

To use the arbor fixture, four eccentric wedges are placed in the arbor, the parts being properly located by the 2.510-inch surfaces of the blocks **B** fitting inside the broached channels of the four work-pieces. Each of the pieces is held in position with a

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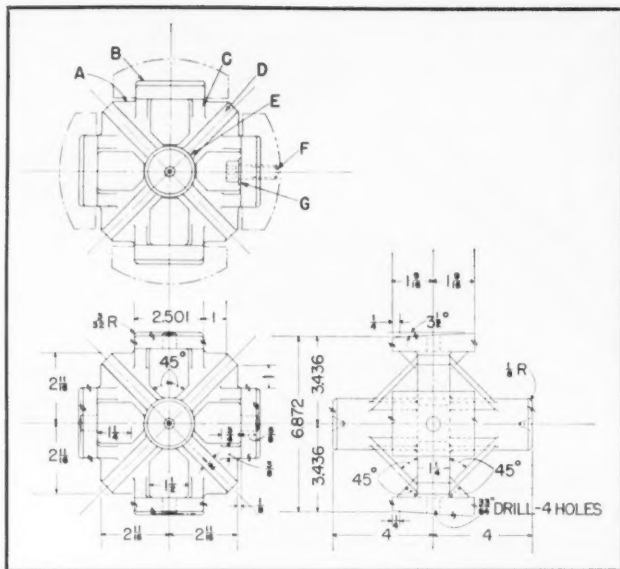


Fig. 2 — Sketch of lathe arbor fixture designed to accommodate four eccentric shaft wedges of the design shown in Fig. 1 for turning and finish grinding

for finish. The surfaces of the work are then finish ground to the correct diameter with the aid of a grinding wheel attachment which is fastened to the cross slide of the lathe.

1/2-inch socket head cap screw, F, placed through a steel washer, G, and then screwed into the threaded hole in the workpiece. These cap screws can be moved conveniently by reason of the cutouts in the body plate.

The arbor fixture is held on centers and driven by the lathe in the conventional manner. When the arbor has been correctly placed, the outside surfaces of the workpiece are turned to 8.750-inch diameter, leaving material

Accident Prevention Through Ready Reference Charts

By H. G. FROMMER

MANY times a piece of lifting equipment, such as a hoist, crane, jib boom, chain, or sling, fails due to excessive overloading rather than faulty construction. Crane operators, hitchers, material handlers,

JIG BORE... DO HOLE SPACING JOBS FAST

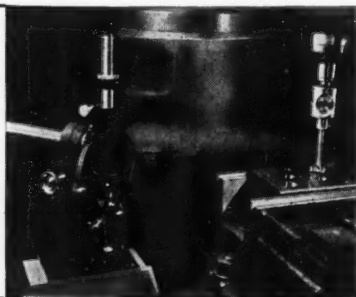
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8	1	3/4	5"=10 3/4	5	6"=6 5/8	4	4"=6	1-1/2	5/8"=4	15	5/8"=10	9	6
7 1/2	1	3/4	8"=16 3/4	6	6"=6 1/2	5	4"=5	1-3/4	1/2"=6	12	5/8"=9	10	7
7	1	1	8"=13 3/4	7	6"=6 3/8	7	3"=4	3	1/2"=4	18	5/8"=8	12	7
6 1/2	1-1/2	1	7"=14 3/4	7	6"=4 3/4	4	2 1/2"=3	5	3/8"=6	16	5/8"=7	13	8
6	1-3/4	1	6"=13	7-1/2	6"=4 1/2	6	2"=4	4-1/2	3/8"=4	24	1/2"=22	5	3
5 1/2	2	1-1/2	6"=12	8	6"=3 1/2	8	2"=3 1/2	5	1/4"=6	24	1/2"=16	7	5
5	2-1/2	2	6"=10 1/2	9-1/2	5"=5 5/8	5	2"=3	6	1/4"=4	37	1/2"=14	8	5
4 1/2	3	2	5"=9	11	5"=3 1/2	6	2"=2 1/2	7			3/8"=14	11	7
4	4	3	4"=7 1/4	14	5"=3 1/2	8	1 3/4"=4	5			3/8"=12	13	8
3 1/2	5	4	4"=5.4	18 1/2	4"=4 3/4	5	1 3/4"=2	10 1/2			3/8"=8	18	12
3	7	5	ANGLES		4"=4 5/8	6	1 1/2"=6	4	PLATES U.M.		3/8"=7	22	13
2 1/2	10	7	SIZES	20'	4"=4 3/8	10	1 1/2"=3 1/2	7	SIZE	10'	1/4"=20	12	7
2 1/4	12	9	8"=8 3/4	2-1/2	4"=3 1/2	8	1 1/2"=2 1/2	10	1"=9	7	1/4"=14	17	11
2	16	12	8"=6 3/4	3	4"=3 3/8	12	1 1/4"=5	6	1"=7	8	1/4"=9	26	16
1 3/4	20	15	8"=6 5/8	3-1/2	3 1/2"=3 1/2	9	1 1/4"=2	15	7/8"=9	7			
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1	63	47	7"=4 5/8	4-1/2	3"=3 3/8	14	3/4"=6	8	3/4"=12	7			
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1/2	250	181	6"=6-1	2-1/2	2"=2 3/8	21	5/8"=6	10	3/4"=7	11			

Fig. 1—This chart shows the operator how many pieces of a given item can be lifted safely with a hoist. Fractions below 1 indicate that the load is too great. These fractions, however, must be shown if the same chart is to be used for hoists of larger capacities.

PANTOGRAPHY

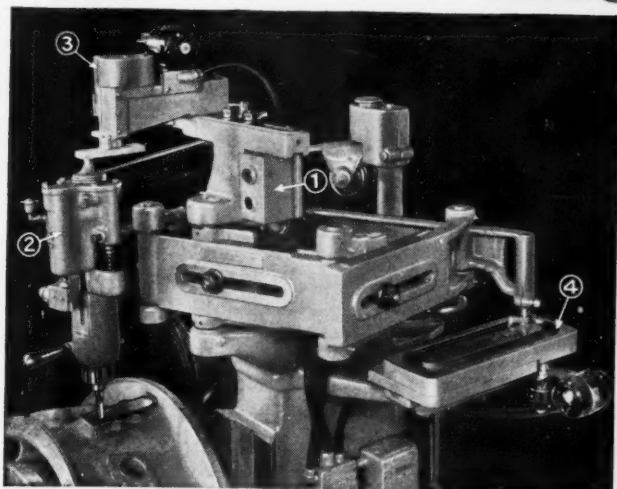
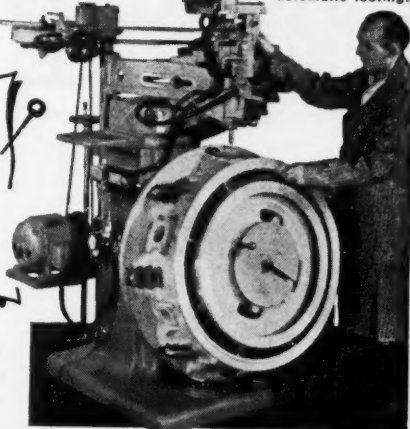
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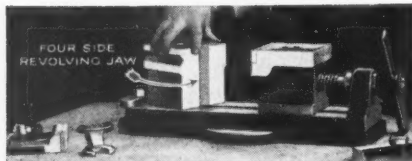
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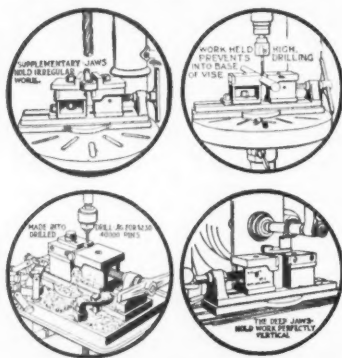
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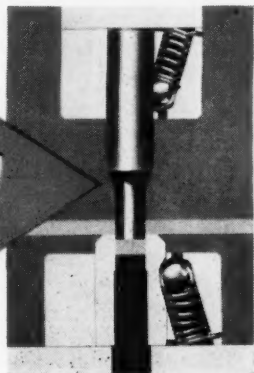
and machine operators who handle a large number of different items obviously cannot take time out to calculate weights of structural steel, bars, rounds, plates, and so on. To eliminate guesswork, to save time, and to protect all lifting equipment, a condensed chart, such as shown in Fig. 1, can be set up quite simply by consulting production records or stock records to determine what items are handled frequently and what their dimensions are. By calculating the weights of such materials (and charting as to common length specifications) and by dividing the resulting figure into the available hoist capacity, a single figure is derived which tells the operator how many pieces can be handled safely in one lifting operation.

A somewhat more difficult problem is encountered where steel plates are concerned, especially today when one has to accept non-standard sizes due to shortages. Various thicknesses, if used, just complicate matters. In order to overcome these difficulties without setting up a chart for each and every thickness, several charts to cover many thicknesses may be set up, as shown in Fig. 2. In this instance, three charts are used; one for the basic thickness of $\frac{3}{8}$ inch, one for $\frac{1}{2}$ -inch basic thickness, and one for $\frac{5}{8}$ -inch basic thickness. By applying simple multiplication or division, using whole factors such as 2, 3, and 4, the operator has only to make the simplest types of calculations to arrive at the actual weight of the plate.

The charts shown in Figs. 1 and 2 can be combined on one $8\frac{1}{2} \times 11$ -inch sheet, covered with sheet acetate (or celluloid) for protection, and mounted in crane cabs, on jib crane columns, on machines, and so on. In addition,

a Punch for Every Purpose

- ... THIN METAL
- ... THICK METAL
- ... SPECIAL ALLOYS
- ... STANDARD SHAPES
- ... UNUSUAL SHAPES
- ... SMALL HOLES
- ... LARGE HOLES



What are your piercing or forming requirements — unusual shapes — large holes — special alloys — thick metals — etc.? There is either an R-B punch in standard shapes and sizes to meet your needs or R-B will manufacture special punches, die buttons and retainers to your specifications.

Regardless of punch type (special or standard) manufactured by R-B for your piercing operation you will find the same standardized R-B features inherent in the design to save you time and money. These include such features as snap-

action radial alignment and vertical locking of punches and mating die buttons, speed and ease of insertion or removal, and complete interchangeability.

Many hole-making applications, that formerly required drilling or some other costly means, now can be done with R-B interchangeable punches. If you have thought your piercing jobs too tough for interchangeable punches, it will pay you to investigate the wide application potential of R-B standardized equipment—R-B engineering service is available for your tough piercing problems.

TOOL STANDARDIZATION IS THE BASIS FOR SAVING PRODUCTION TIME. WITH R-B YOU GET THE ACCEPTED STANDARD OF THE SHEET METAL INDUSTRY—IN STANDARD DESIGN FEATURES THAT SAVE IN ENGINEERING, DIE CONSTRUCTION AND OPERATION.



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Also Produced in Allied's Four Plants . . . HARDENED AND PRECISION GROUND PARTS • STANDARD CAP SCREWS • SPECIAL COLD FORGED PARTS • SHEET METAL DIES • ALLITE DIES CAST OF ZINC ALLOY • JIGS • FIXTURES

WEIGHTS OF STEEL PLATES (LBS PER PLATE) SEE EXPLANATIONS FOR THICKNESSES

EXPLANATION OF PLATE WEIGHT CHARTS		CHART #1 (WEIGHT IN LBS.)									
	Chart #	PLATE LENGTH IN FEET									
		4	6	8	10	12	14	16	20		
3/16" plate	1	120	180	240	310	370	430	490	610		
1/4" plate	2	180	270	360	450	540	630	720	900		
5/16" plate	3	240	360	480	600	720	840	960	1200		
3/8" plate	4	310	460	610	760	910	1060	1210	1510		
1/2" plate	5	370	550	730	910	1090	1270	1450	1810		
5/8" plate	6	430	640	860	1070	1280	1490	1700	2110		
3/4" plate	7	490	730	980	1220	1470	1710	1960	2450		
1" plate	8										
1-1/4" plate	9										
1-1/2" plate	10										
2" plate	11										
2-1/2" plate	12										
3" plate	13										

EXPLANATION OF PLATE WEIGHT CHARTS		CHART #2 (WEIGHT IN LBS.)									
	Chart #	PLATE LENGTH IN FEET									
		4	6	8	10	12	14	16	20		
3/16" plate	1	160	240	320	400	480	560	640	800		
1/4" plate	2	240	360	480	600	720	840	960	1200		
5/16" plate	3	320	480	640	800	960	1120	1280	1600		
3/8" plate	4	400	600	800	1000	1200	1400	1600	2000		
1/2" plate	5	480	720	960	1200	1440	1680	1920	2400		
5/8" plate	6	560	840	1120	1400	1680	1960	2240	2800		
3/4" plate	7	640	960	1280	1600	1920	2240	2560	3200		
1" plate	8										
1-1/4" plate	9										
1-1/2" plate	10										
2" plate	11										
2-1/2" plate	12										
3" plate	13										

EXPLANATION OF PLATE WEIGHT CHARTS		CHART #3 (WEIGHT IN LBS.)									
	Chart #	PLATE LENGTH IN FEET									
		4	6	8	10	12	14	16	20		
3/16" plate	1	200	300	400	500	600	700	800	1000		
1/4" plate	2	300	450	600	750	900	1050	1200	1500		
5/16" plate	3	400	600	800	1000	1200	1400	1600	2000		
3/8" plate	4	500	750	1000	1250	1500	1750	2000	2500		
1/2" plate	5	600	900	1200	1500	1800	2100	2400	3000		
5/8" plate	6	700	1050	1400	1750	2100	2450	2800	3500		
3/4" plate	7	800	1200	1600	2000	2400	2800	3200	4000		
1" plate	8										
1-1/4" plate	9										
1-1/2" plate	10										
2" plate	11										
2-1/2" plate	12										
3" plate	13										

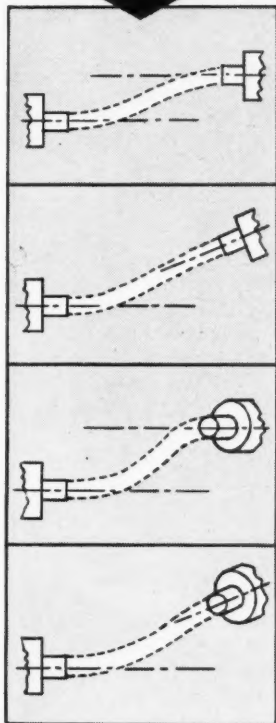
Fig. 2—Weights of various sizes and thicknesses of steel plates are determined through these charts without complex calculations. Notes in upper left section explain the simple procedure for determining weights.



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Flexible Shafts
are "naturals"
for jobs like these

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to your alignment problems**

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Alignment is never a factor when S.S.White flexible shafts are used to transmit power or control. Their non-rigid construction automatically compensates for misalignment — thereby eliminating the costly machining, assembly, and the operational troubles often experienced with rigid couplings.

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April, 1953

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SHARP NAMEPLATE MARKING

Model
No. 4



The nameplate on your product is your signature. Keep it neat and legible! Accurate location and alignment are assured with this

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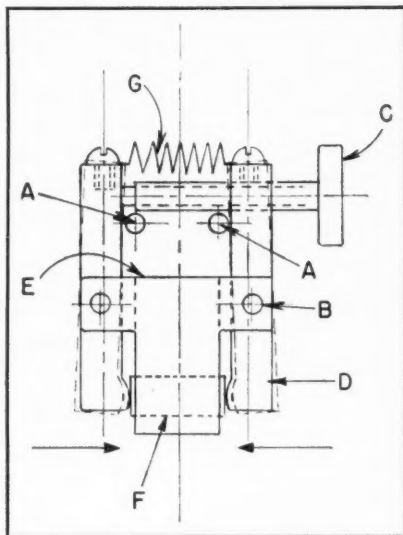
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CHICAGO - 13 - ILLINOIS

when placed on both sides of a double card, $4\frac{1}{4} \times 5\frac{1}{2}$ inches, a pocket guide for hitchers and yardmen is provided.

Equalizing Clamp

By F. A. ADAMS

THE accompanying sketch shows a unique equalizing clamp which can be adapted for use on many types



Sketch of equalizing clamp

of milling and profiling fixtures. Clamp straps **D** are arranged to pivot on dowel pins **B** which are press fitted into support block **E**. As knob screw **C** is turned in a clockwise manner, the clamp straps **D** are pivoted in the direction indicated by arrows, thus clamping the workpiece **F** firmly in place.

When pressure on the work is released, spring **G** holds the clamping ends of the straps **D** apart so that the

EXCEL No. 6 PAYS BOTH WAYS

**TOOL & CUTTER
GRINDING
HEADQUARTERS
in the smaller shop—**

**EXTRA SHARPENING
SERVICE
in the larger plant—**



*Builders
of Precision
Grinders
for 79
Years*

An outstanding value in price and performance! The Excel No. 6 Universal Cutter and Tool Grinder will accurately sharpen reamers and milling cutters in a wide variety of shapes and sizes. A full line of attachments is available for a multitude of applications including cylindrical and internal grinding. Base optional.

Swings work.....8" dia. x 16" long
Face mill capacity.....12" dia.
Table surface.....4" x 24"

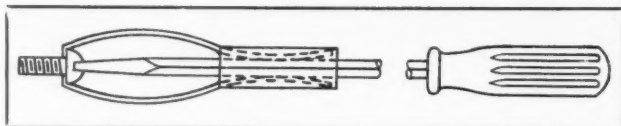
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CUTTER &
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HYDRAULIC & HAND
FEED SURFACE GRINDERS

*Write
for
BULLETIN
MM-43*



Sketch showing how patented type screw driver can be used for holding a cut off round head screw so that a burr-free taper can be easily ground on the end

workpiece can be easily unloaded. Pins A limit the amount of pivot of the clamp straps so that a minimum of turning of the knob C is required in clamping work.

Simple Method for Holding Cut Off Round Head Screw While Deburring

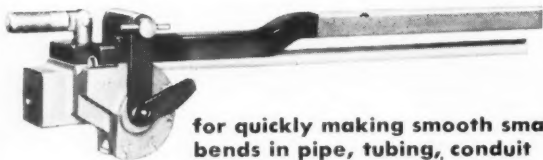
By C. A. MOWREY

FROM time to time, practically every shop finds it necessary to reduce the length of a round head screw for one reason or another. Probably the quick-

est way to perform this job is with a hack saw; however, the writer has found that this operation results in a burr on the end of the screw, thereby causing difficulty in starting the screw in its proper hole. To eliminate this difficulty, we use a Hold-E-Zee or similar patented screw driver, as shown in the accompanying sketch, to hold the cut off screw while a burr-free taper is ground thereon with an abrasive wheel.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

GREENLEE HAND BENDER



for quickly making smooth small-radius bends in pipe, tubing, conduit

Forming small-radius bends without flattening or kinks is simple, speedy work with a GREENLEE Hand Bender. Ideal in the shop for pipe and tubing installations on machines... especially designed to form neat bends for sharp corners, nooks and other close quarters. Various models and sizes for steel, copper, brass and aluminum tubing or pipe, rigid and thin-wall conduit



GET FREE FOLDER E-207 AND BOOKLET E-201. Complete facts and prices on the Greenlee Bender line. Write Greenlee Tool Company, 1984 Herbert Avenue, Rockford, Illinois.





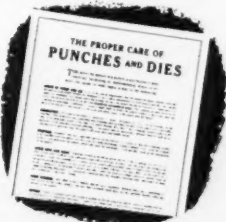
***In stock* 400 sizes of 21 standard CLEVELAND PUNCHES!**

For your convenience we carry 400 sizes of our 21 standard punches and matching dies in stock. Punching diameters range from $\frac{5}{32}$ " to $1\frac{1}{2}$ ". You will get prompt shipment of any standard punch. Special sizes or shapes will be made to your specifications.

Don't overlook the savings offered by the Cleveland system of standardization. You can punch any size hole from $\frac{1}{8}$ " to $1\frac{1}{16}$ " by using the same coupling nut and punch stem.

Are you obtaining maximum service from your Punches and Dies? Protect tool life—send for copies of our two-color wall instruction chart, "Proper Care of Punches and Dies."

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PUNCHING TOOLS & DIES

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E. LANSING

..... **POWER PRESSES**

FABRICATING TOOLS

CLEVELAND 14, OHIO

news of the industry

Wickman Completes New Plant

The Wickman Manufacturing Company has announced the completion of its new factory which is located at 10325 Capital Ave., Detroit, Mich. The new building is said to assure adequate space for both office and factory employees and provide proper lighting levels for general and individual production operations. Air conditioning, engineered heating, and humidity control are a few of the many features incorporated into the building to provide maximum quality control of products, as well as for comfort of the personnel.

The company states that the new factory will allow it to better meet in-

creasing demands for its line of diamond wheels, diamond drills, bench grinders, reamers, and tapping attachments.

Romulus Tool & Engineering

A new company, known as Romulus Tool & Engineering, has been formed at 36051 Goddard, Romulus, Michigan. Owned and operated by Joseph Player, president, and Edward Halik, both former employees of Turchan Follow-er Machine Company, the new company will build jigs, fixtures, controls, and special machinery, complete from engineering to the finished machine tool if required.



New plant of Wickman Mfg. Co., Detroit, Michigan

U N I O N



Accuracy

The superior performance of Union tools stems from years of experience in making a wide variety of cutting tools for an exacting trade.

UNION TWIST DRILL COMPANY • ATHOL, MASSACHUSETTS

Milling Cutters Gear Cutters Twist Drills Hobs Reamers Carbide Tools

OWNERS AND OPERATORS OF: S. W. CARD MANUFACTURING CO. DIV., Mansfield, Mass.

BUTTERFIELD DIVISION, Derby Line, Vermont and Rock Island, Quebec

New Counterbore with interchangeable pilots



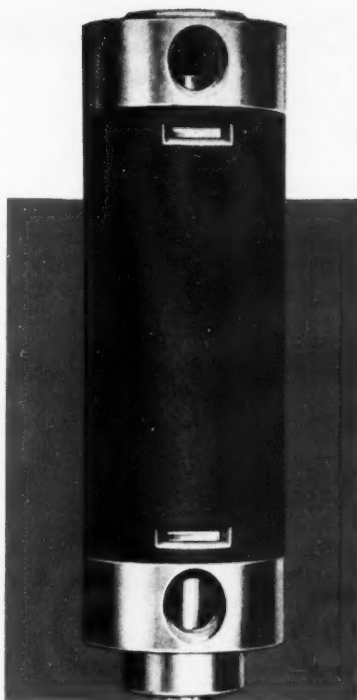
Photograph by Morton Berger

Introducing the Butterfield High Speed Counterbore and Spot Facer
in standard and aircraft designs . . . latest example of
Butterfield craftsmanship. *Ask your distributor.*

B U T T E R F I E L D

Union Twist Drill Company Butterfield Division Derby Line, Vermont, U. S. A.

DRILLS • TAPS • DIES • REAMERS • COUNTERBORES • SCREW PLATES



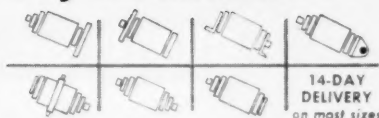
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mounts . . .***

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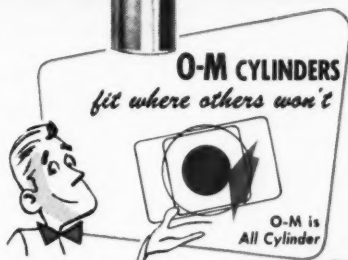
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CYLINDERS

***adaptable to
any installation! . .***



14-DAY
DELIVERY
on most sizes



Available in a full range of sizes (1½" to 8" bores) with standard, 2 to 1 or oversize rods. All machined steel with bearing bronze, no castings. Completely interchangeable parts.

Write today for FREE catalog and complete set of ½ and ¼-scale templates showing all cylinders and mounting brackets.

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A.S.L.E. 8th Annual Meeting

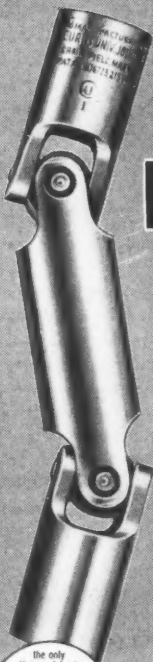
"Lubrication Engineering and Increased Plant Efficiency" is the theme of the 8th annual meeting of the American Society of Lubrication Engineers which is scheduled to be held April 13, 14, and 15 at the Hotel Statler in Boston, Mass. Topics such as "What Lubrication Means to the Builder of Machine Tools," "Textile Machinery Lubrication from Manage-

ment's Point of View," and "Practical Application of Laboratory Test Data" will be presented. Special subjects that are aimed at correcting common problems existing in all industrial plants and will enable maintenance departments to improve production by minimizing down time due to premature mechanical failures, will be covered.

The society is also sponsoring its Annual Lubrication Exhibit in the

ballroom of the Hotel Statler. Here the members and guests will see in operation practically every type of device available for modern lubrication practice, as well as the latest developments in modern lubricants and oils for every industry. Some of the speakers who will address the A.S.L.E. are R. M. Jones, vice president, Saco - Lowell Shops; J. J. Jaeger, assistant manager of engineering, Pratt & Whitney Division of Niles-Bement-Pond; Edwin Crankshaw, chief engineer, Cleveland Graphite Bronze Co.; and H. O. Wulp, chief metallurgist, S.K.F.

Greater Strength - Less Weight



Each element is made of the special steel alloy and subjected to the exact heat treatment required to provide the high *balanced* strength and light weight which characterize all

CURTIS UNIVERSAL JOINTS

Add to this precision design and simple construction, and you have the reasons why Curtis Universal Joints are the most durable, trouble-free joints available . . . for uses ranging from instrument controls to heavy steel mill applications.

ONLY CURTIS OFFERS ALL THESE ADVANTAGES

Availability — 14 sizes always in stock; bored or unbored hubs. 6" hub diameter joints or special machining to specifications.

Simplicity — fewer parts, simpler construction.

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Not sold through distributors; write direct for free engineering data and price list.

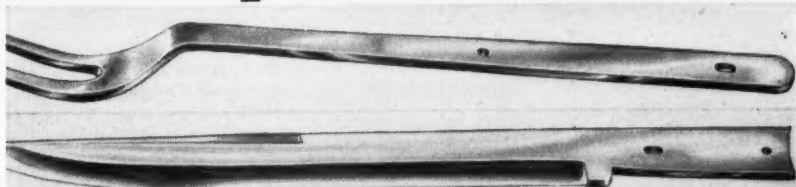
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PIVOT HIGH SPEED STEEL PUNCHES

STRAIGHTGROUND • WHIPSLEEVED

INCREASE PRODUCTION AT KA-BAR, INC. MORE THAN 10 TIMES!

• Perforating .058 Chrome Vanadium Rockwell B95-B100 blade steel with .101" round and .101" x .156" oval holes is a problem for any production manager . . . a tough job for **any** punch. So is the perforation of .0897" type 410 Stainless Rockwell C40/C45 with .110" round and .160" x .250" oval holes. Ordinary punches break too often to maintain production. Ka-bar Inc., manufacturers of quality cutlery, not only solved these problems but **increased production 10 times** by using Pivot Straightground Whipsleeve Punches.



Mr. S. Pederson, efficient Production Manager of Ka-bar, Inc. of Olean, N. Y. says:

"We certainly have been much pleased with their performance. The need for stopping a job to replace a broken punch which at one time occurred all too frequently on these jobs just doesn't happen with Pivot Punches. We consistently get a clean burr-free hole which also gives us trouble-free assembly. The savings are obvious."

• For more punching power and accuracy, for maximum punch life and minimum down time, for increased production at decreased costs . . . use Pivot Punches.

SEND FOR CATALOG WITH STANDARD PRICES. DEPT. M.M.

pivot punch and die corp.

NORTH TONAWANDA, N. Y.

National Machine Tool Company Changes Name

The corporate name of the National Machine Tool Company has been changed to Heinrich Tools, Inc., Racine, Wis. The organization has manufactured machine tool products for industry since 1918, including Heinrich "Handnibs" (hand nibblers, shears, rod cutters, and punches); "Handy" screw-type drill press vises; "Grip-Master"

screwless drill press vises; and "Grip-Master" fixture locks.

New Warner & Swasey Ohio Plant Commences Operation

The newly-completed New Philadelphia, Ohio, plant of The Warner & Swasey Company, builder of machine tools and precision instruments, went into operation recently. The plant,

costing approximately \$1,500,000 and providing 137,000 square feet of manufacturing floor space, has been added to the company's facilities for the purpose of making parts and minor assemblies which will be shipped to the company's main plant in Cleveland for assembly into complete machines.

Approximately 400 people will be employed at the new plant when it reaches full operation. The new plant supplements a plant which the company has operated in New Philadelphia since 1950 for the manufacture of the Gradall, its earth-moving machine.

Shims stamped from LAMINUM® look like solid metal but actually are made up of layers of .002 or .003 inch brass or steel.



when a shim is LAMINATED here are your advantages:

REDUCED MACHINING COST: You machine only to easy tolerances. The laminated shim is *adjustable*—you simply peel laminations to get exactly the spacing you need.

SPEEDED PRODUCTION: Final fitting can be done right at the job. You don't have to take parts back and forth for further machining, grinding or filing.

SIMPLIFIED USE: Shims come to you in one "pack" for each application. They are precision-stamped to your exact specifications. No counting, no stacking, no miking.

ADDED SERVICE FEATURE: Throughout the life of the machines you produce, the simple removal of a shim lamination provides a unique adjustment for the take-up of wear.

LAMINUM

THE SOLID SHIM THAT  FOR ADJUSTMENT

LAMINATED SHIM COMPANY, Inc.

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GLENBROOK, CONN.

CUSTOM SHIMS

STAMPINGS

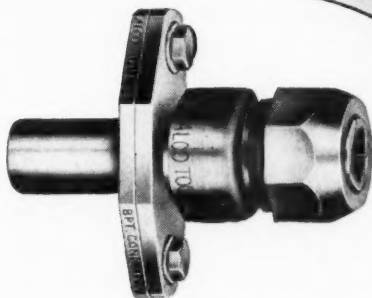
SHIM STOCK

Releasing Model Tap and Die Holders

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HAND SCREW
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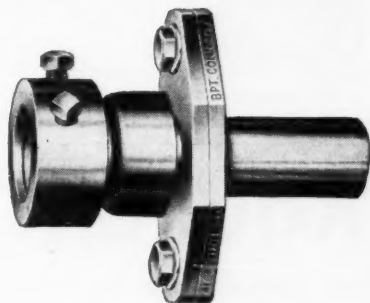
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for
TURRET
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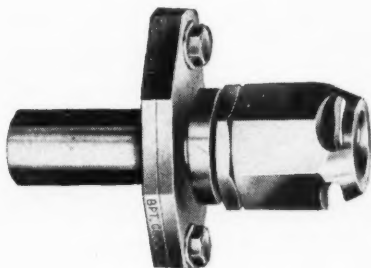


RELEASING TAP HOLDER . . . Holds taps securely by direct application of pressure in jaws — NO BUSHINGS NEEDED. Full floating flanges set taps absolutely concentric with hole. Result: Even wear on all leads of tap, no tap breakage, perfect threads.

RELEASING BUTTON DIE HOLDER . . . Simple button dies deliver full measure of high grade production in the ALCO holder. Adjustable, concentric alignment feature of this tool insures perfect threads and makes dies last longer.



RELEASING ACORN DIE HOLDER . . . The only acorn type releasing model with adjustable concentric alignment. Quick and positive set-up. Chip elimination and effective lubrication through adequate openings. Rigid drive mechanism — no pins used.



THE ALCO TOOL CO.
52 BIRDSEYE STREET, BRIDGEPORT, CONN.

ALCO EFFICIENT **TOOLS**



(Left to right) Edmund J. Klonowski, John Kendall, and Wallace F. Ardussi

P.M.I. Inducts Two Western New York Executives

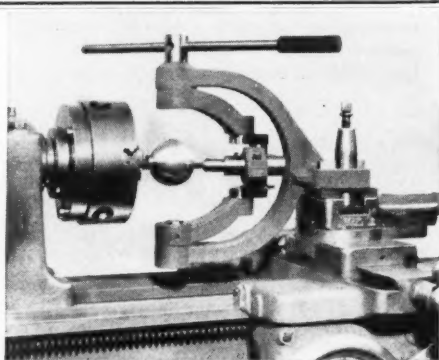
At a recent dinner meeting and tour of the Ford Stamping Plant in Buffalo,

New York, two executives in that area were inducted into The Pressed Metals Institute, the national association of metal stampers. The two new members of the institute are Edmund J. Klonowski, sales manager of the Punch Division, Pivot Punch & Die Corp., North Tonawanda, N. Y., and John Kendall, superintendent, The Ford Stamping Plant, Buffalo, N. Y. The accompanying illustration shows Mr. Klonowski and Mr. Kendall being congratulated by Wallace F. Ardussi, president of the Institute.

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The Accurate Short Cut
for Turning
Any Radius—
Convex, Concave,
or Ball.

* PATENT APPLIED FOR



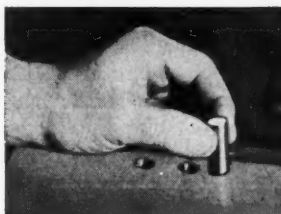
Cutting Convex or Ball Radius

Raditurn

cuts any radius, cuts cost . . . adaptable to any lathe

Further information may be obtained from
Territories available for responsible agents or distributors.

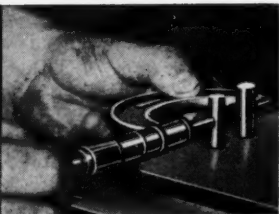
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OF RETCO MFG. AND SALES • BOX 13 • FRANKFORT, INDIANA



Check hole sizes



and locations,



find centers,

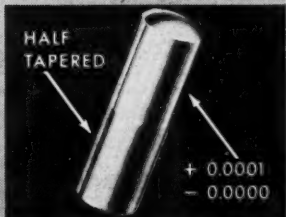


gage slots,

**and dozens of
other uses with**

HORBERG

precision taper



Pin Gages

SAVE TIME AND MATERIALS

Oil-hardened tool steel tapered pin gages accurate to $+0.0001'' - 0.0000''$ insure dependable sizing and location of holes and slots for machinists, set-up men, tool and die men, inspectors, all who need precise hole measurement.

CONCENTRIC TAPER on lower half of each gage fits holes $0.0012''$ smaller

than standard letter, fraction, and number size drill holes. Makes insertion easier. Permits gaging of odd-size holes and slots.

ALL GAGES are $1\frac{1}{2}$ inches long. Sets contain a pair of each size in a plastic case with 4-place decimal equivalents of each size plainly marked.

ALL ITEMS STOCKED FOR IMMEDIATE DELIVERY

THE *Horberg* GAGE COMPANY

Quantity **23 STAPLES ST., BRIDGEPORT, CONN.**

..... Letter sets @ \$45. Please Rush checked items and literature to

52 gages (A-Z)

..... Fraction Sets @ \$50.

60 gages ($\frac{3}{4}''$ to $\frac{1}{2}''$
in $\frac{1}{4}''$ steps)

..... Number Sets @ \$90.

120 gages (1 to 60)

..... Single gages @ \$ 1.

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title.....

John Hassall, Inc., Plans New Plant

John Hassall, Inc., Brooklyn, N. Y., manufacturer of cold-headed fasteners, has announced plans for the construction of a new plant on a 15-acre plot on Cantiague Rock Road between Northern State Parkway and Jericho Turnpike in Westbury, Long Island. The new building, which is designed to cover an area of approximately 88,000 square feet, will be of modern design and will provide a means for

economical operation. About 5,000 square feet of office space will occupy the northeast corner of the fireproof building. Heating will be of the hot water type, circulated by pumps and thermostatically controlled. The area about the building will be suitably landscaped, and ample parking facilities have been arranged.

The company, originally established in 1850, started in New York City and moved to the Brooklyn address in 1888. Present facilities consist of four three-story connected buildings. The firm now employs 125 men and women; however, the new plant will have facilities for a working force of 200.

J. F. Maisch Elected Treasurer of Houghton

John F. Maisch was elected treasurer of E. F. Houghton & Co., Philadelphia, by the board of directors at the organization meeting following the annual stockholders' meeting recently. Mr. Maisch has been controller of the company since 1950 when he came to Houghton from Lybrand, Ross Brothers & Montgomery, a Philadelphia accounting firm. He succeeds William F. MacDonald who has been holding the offices of president and treasurer but has relinquished the latter in or-



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steel drill jig bushings
Ask for handy "Flip-a-page"
Catalog (8-649) and prices
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DRILL JIG BUSHINGS**



DIRECTS A BEAM OF WHITE LIGHT ON YOUR CLOSE PRECISION WORK

**Uneda
LIGHT**

Tool and Die Makers acclaim it for utility, getting into nooks and crevices hard to reach with ordinary light—for lining up punches in dies or working with the scriber in close places. Completely adjustable and portable. Light does not reflect back to your face. Ideal for inspectors seeking burrs, flaws, etc.

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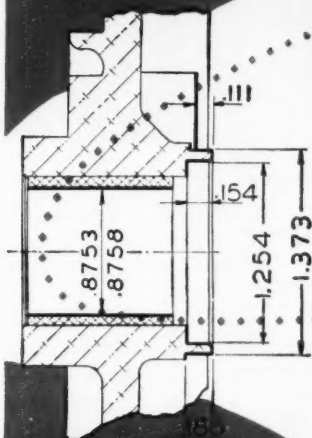
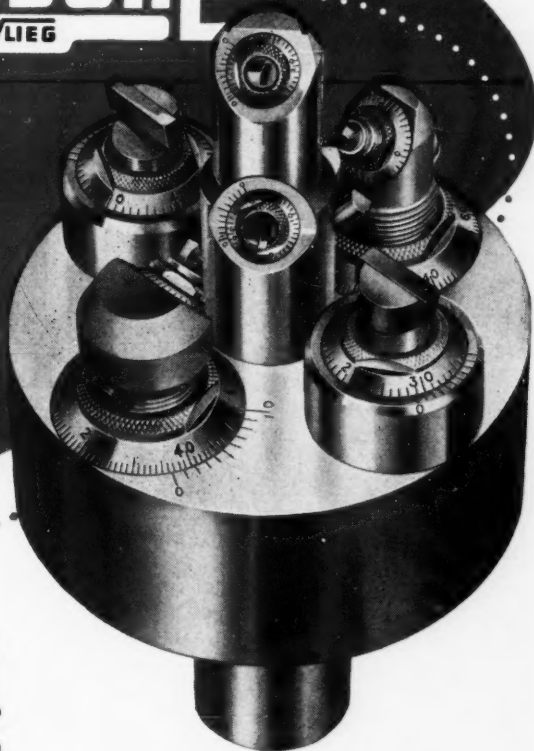
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Literature

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MANUFACTURING CO.**
Box 429-M, Libertyville, Illinois

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... THE
*Multi-purpose
single point
adjustable tool*
for
**PRODUCTION BORING,
TURNING and
FACING OPERATIONS.**



SURFACES MACHINED
ARE INDICATED
BY HEAVY LINES

- Illustration shows typical example of cluster tooling using standard Microbore units for machining eight surfaces in a magneto plate at one pass. Each tool is independently adjusted by proven micrometer vernier principle and precise limits of accuracy are maintained on production runs.

DEVILIEG MICROBORE COMPANY

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der to devote more time to his duties as president.

At the annual stockholders' meeting Major A. E. Carpenter was reelected chairman of the board and Mr. MacDonald was renamed president. Directors who were also reelected are Mrs. E. A. Carpenter, Mr. Carpenter, Mr. MacDonald, R. H. Patch, D. J. Richards, C. H. Butler, H. B. Fox, J. T. Eaton, D. C. Miner, and W. K. Barclay.

J. J. Demuth Named Consultant to N.P.A.

J. J. Demuth, engineering consultant for Ehrhardt Tool & Machine Co., St. Louis, Mo., and past president of the American Society of Tool Engineers, has been named consultant to the Tool, Die, Jig, and Fixture Section, Metalworking Equipment Division, National Production Authority, Washington, D. C. He will devote three days a week to his new duties.

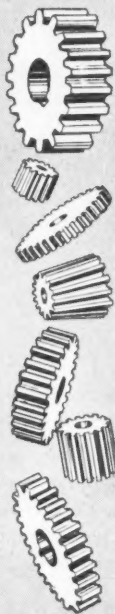
Mr. Demuth was recently given a testimonial award by the Na-



J. J. Demuth

tional Tool & Die Manufacturers Association for his previous service as chief of this important section of N.P.A. His extensive knowledge of the tool and die industry will again be utilized by N.P.A. in coordinating tool and die production with the national

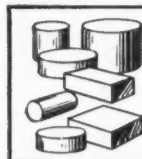
GREAVES-SILENT BAKELITE GEARS



THEY'RE STRONG, SILENT!

You'll appreciate the smooth, silent operation of Greaves-Silent Bakelite Gears. You'll marvel at the big power loads they can carry . . . and their remarkable ability to operate successfully when completely submerged in water. Cost is low so you'll save plenty of time, money and labor. Silent gears of rawhide and Fabriol also available.

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When you need simple, accurate, high production keyway broaching specify American keyway broaches.

This complex American Broach is used to finish an automatic drive gear's helical involute teeth. No further internal machining is necessary on the gears which must pass rigid tests before final assembly.

Whether your problem is keyways or complicated involute splines you'll find American-engineered broaches are built to give you higher production and greater accuracy. For American's quotation on your broaching requirements send a part-print and hourly requirements to American today!

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American **BROACH & MACHINE CO.**
A DIVISION OF SUNDSTRAND MACHINE TOOL CO.
ANN ARBOR, MICHIGAN



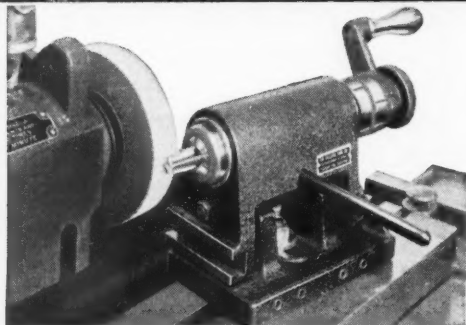
defense program. Mr. Demuth replaces Ross Adams who has served in a similar capacity of N.P.A. during the past six months and is now associated with The Fellows Gear Company, Springfield, Vermont.

20 Machinery Firms Receive Management Award

Certificates of Management Excellence for the year 1952 have been

awarded to 20 manufacturing companies in the machinery field by the American Institute of Management, New York, N. Y. Fifteen of these companies which received the award for the third consecutive year are Briggs and Stratton Corp., Milwaukee; General Electric Co. and Ingersoll-Rand Co., both of New York; Elliott Co., Jeanette, Pa.; Chicago Pneumatic Tool Co., Chicago; American Chain & Cable Co., Inc., Bridgeport, Conn.;

YESTERDAY'S PIONEER . . . TODAY'S LEADER



WELDON Tap Sharpening Fixture

● This is a simple, effective device which makes tap sharpening easy. It is specially designed for use with the well known Weldon End Mill Sharpening fixture. The rocking head is actuated by a cam creating correct radial clearance at point of tap. This device serves taps from $\frac{1}{8}$ " to 1". Compared with conventional devices it is relatively inexpensive.

*Weldon Distributors throughout U.S.A. and Canada
carry complete stocks to serve you.*

THE WELDON TOOL COMPANY

3000 WOODHILL ROAD . . . CLEVELAND 4, OHIO

Chain Belt Co. and A. O. Smith Corp., both of Milwaukee; Food Machinery & Chemical Corp., San Jose, Calif.; Duff-Norton Mfg. Co., Joy Mfg. Co., Mesta Machine Co., and Rockwell Mfg. Co., all of Pittsburgh; Link-Belt Co., Chicago; and Westinghouse Air Brake Co., Wilmerding, Pennsylvania.

Five other companies received the A. I. M. award for the second time: namely, Air Reduction Co., Inc., New York; Harris - Seybold Co. and Thompson Products, Inc., both of Cleveland; Intertype Corp., Brooklyn; and Lynch Corp., Anderson, Indiana.

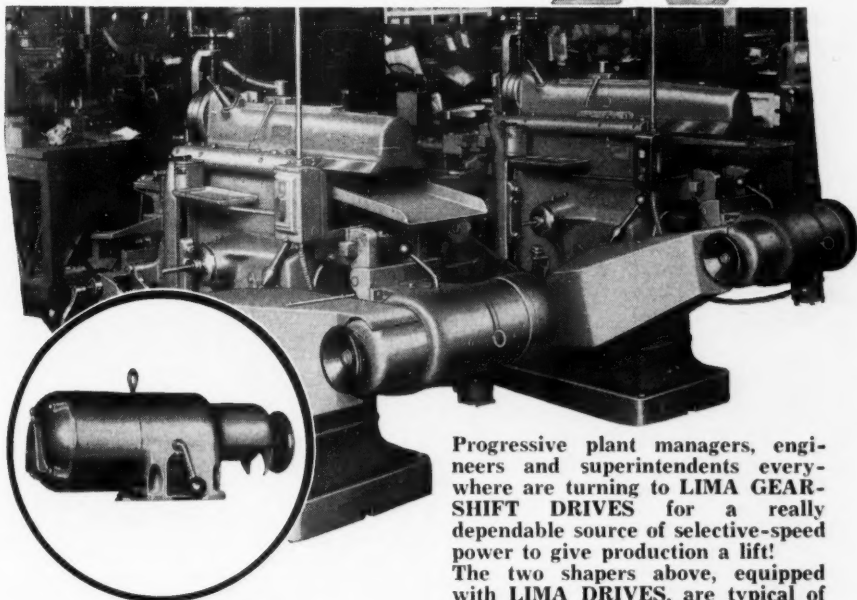
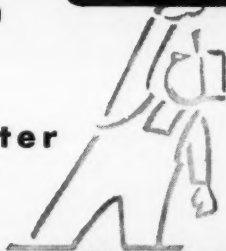
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gives

a

LIFT

at International Harvester
Company Plants



LIMA GEARSHIFT DRIVES

Available for prompt delivery in
constant-horsepower ratings of $\frac{1}{2}$ to
15 HP. Four or eight speeds.

Progressive plant managers, engineers and superintendents everywhere are turning to LIMA GEARSHIFT DRIVES for a really dependable source of selective-speed power to give production a lift!

The two shapers above, equipped with LIMA DRIVES, are typical of the many different types of machines Lima has individually motorized at the Fort Wayne Works of International Harvester Company.

Let Lima survey your machines—get the production advantages you want.

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Representation in principal cities

GEARSHIFT DRIVES & MOTORS

LIMA

THE LIMA ELECTRIC MOTOR COMPANY



160 FINDLAY ROAD • LIMA, OHIO

Warner & Swasey Holds Annual Sales Conference

Seventy Warner & Swasey sales and service representatives from 25 offices in the United States and Canada gathered in Cleveland recently for the company's annual sales conference. Out of the meetings came the announcement of the development of two new machine models, extending the size range of Warner & Swasey post-war automatic designs. The first of the new models is a 2-AC single-spindle automatic chucking machine which

is said to be capable of producing unusually accurate machined parts in larger sizes than any other Warner & Swasey automatic models thus far available. The second model is a small high-speed multiple-spindle automatic machine for handling material in bar form up to 1 1/4 inches in diameter.

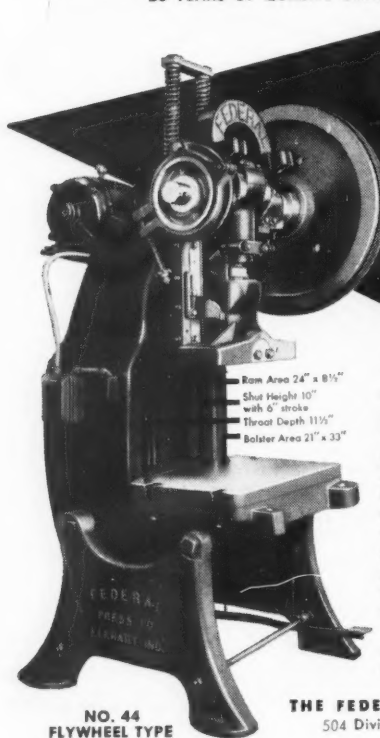
Wilbur C. Stauble Elected President of Holo-Krome

Graham H. Anthony, chairman of the board of Veeder-Root, Inc., and its subsidiary, The Holo-Krome Screw Corp., both of Hartford, Conn., has announced that at a meeting of the board of directors of the two corporations, Wilbur C. Stauble was elected president and chief executive officer of Holo-Krome and a director and member of the executive committee of Veeder-Root to fill vacancies caused by the resignation of United States Senator, William A. Purtell.

Mr. Stauble, a native of New Haven, together with Mr. Purtell and others, founded The Holo-Krome Screw Cor-

FEDERAL *Overload Indicator* PRESSES

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NO. 44
FLYWHEEL TYPE
35-ton Capacity

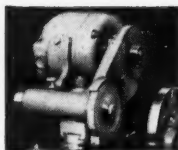
Don't let
light bulky
work tie-up
big-ton presses!

This Federal #44 has generous, "oversize" dimensions, making it ideal for light, bulky work that small standard presses can't handle. Note its *extra* shut height, *extra* throat depth, *extra* ram and bed areas. Typical Federal workmanship and quality. Available in flywheel or geared models—also in 26-ton size. High speed controls, optional.

Write for new catalog showing complete line. Six to 80-ton capacities.

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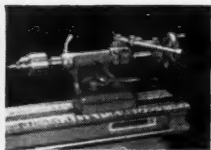
504 Division Street, Elkhart, Indiana



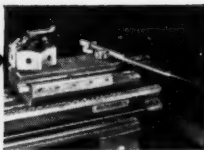
External Grinder



Milling Attachment



Handlever Tailstock



Handlever Bed Turret



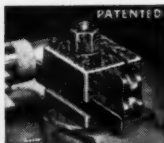
Telescopic Taper Attachment



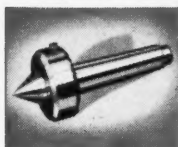
Handwheel Collet Attachment



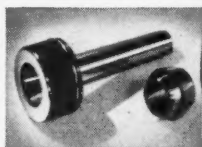
Handlever Collet Attachment



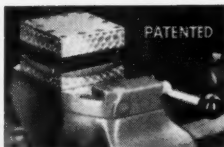
10 in 1 Tool Holder



Ball Bearing Live Center



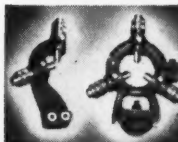
Adjustable Collet Bushing Chuck



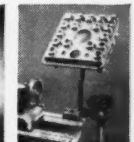
Square Turret Tool Block



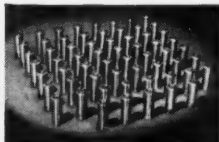
Handlever Double Tool Cross Slide



Telescoping Jaw Follower Rest and Center Rest



Collet Rack



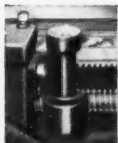
Steel and Brass Collets



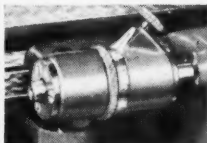
Step Chucks and Closers



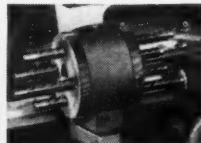
Centers and Drill Pads



Thread Dial Indicator



Micrometer Carriage Stop



Four Position Carriage Stop



Four Position Cross Slide Stop



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Coolant Pump



Universal Table

SOUTH BEND Lathe Attachments

- Cut Production Time
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- Speed Up Tooling
- Perform Special Classes of Work
- Reduce Operator Fatigue

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Building Better Tools Since 1904

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INDIANA



poration in 1929, and Mr. Stauble has been active in its management, as well as a member of its board, ever since. In 1942, he was elected executive vice president of Holo-Krome.

SPS Nearing Completion of \$10,000,000 Expansion Program

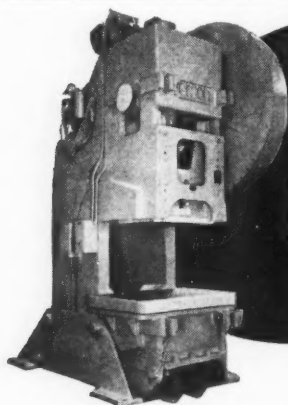
Building what amounts to a new plant in and around its existing struc-

tures, Standard Pressed Steel Co., Jenkintown, Pa., is rapidly coming to the conclusion of its \$10,000,000 machinery and new-plant expansion program. Starting early in 1950, SPS began razing some of its older buildings, removing the walls of others, and tying in more than 325,000 square feet of new plant area to its present site.

When the program is finished, SPS, a leading producer of socket screws, will have more than 650,000 square

feet of integrated floor space under one roof. The structure will house the manufacture of all products — Unbrako socket screws, Flexloc self-locking nuts, Hallowell steel shop equipment, and aircraft specialty parts.

The project is a 10-year expansion program telescoped into three years. It includes new plant construction, modernization of equipment and facilities, the building of ultra-modern employee locker and washroom facilities, and the development of nine acres of land for employee and community recreation and parking.

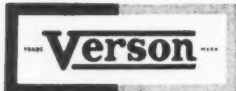


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operate with
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Accuracy and
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Verson O.B.I. presses combine high utility with the performance standards of big, expensive machines. They operate with accuracy and precision on a wider range of jobs than any other press. In addition, they are easily adaptable to high production set-ups.

As further proof of value, check these Verson features . . . heavy allsteel frame . . . machine cut steel gear and pinion . . . gears running in oil . . . mechanically interlocked pneumatic clutch and brake unit . . . full electric controls. Six models—capacities from 90 to 250 tons. For complete information, write today for bulletin O.B.I.-49.

A Verson Press for every job from 60 tons up.



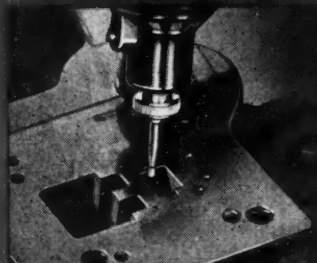
**VERSION ALLSTEEL
PRESS CO.**

9310 S. Kenwood Ave., Chicago 19, Ill.

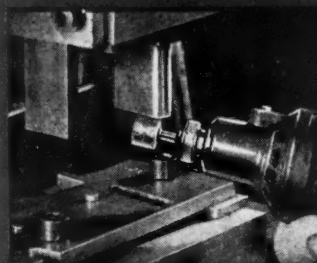
So. Lamar at Ledbetter Dr., Dallas, Tex.



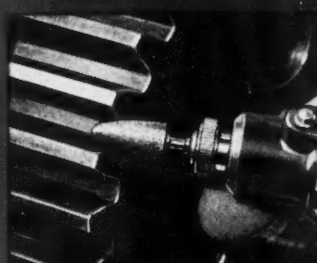
MARKING PARTS



GRINDING DIES



SHARPENING MACHINE TOOL



BURRING MACHINE PARTS

PAYS FOR ITSELF ON
"HARD-TO-GET-AT" JOBS

DREMEL

Electric

MOTO-TOOL



Approximately
27,000 R.P.M.

Dremel Moto-Tools are time tested—have been widely used in industry for over fifteen years. A veteran of World War II, Moto-Tool served in war plants and at military maintenance bases throughout the world. Thousands of these mighty mid-gets helped to make the atomic bomb—were used to establish production records in defense industries during the last war. Hundreds of toolroom and production line operations, such as polishing and grinding dies, burring parts, marking tools, sharpening cutters, touch up jobs, etc. are accomplished in seconds, without tearing down "set-ups." Moto-Tool is sturdily constructed for long lasting industrial service. Weighs only 13 oz.—dynamically balanced for vibrationless operation.



MOTO - TOOL KIT NO. 2 contains 23 accessories, including high-speed steel cutters and Model 2 Moto-Tool in natural finish hardwood case\$23.50

MOTO - TOOL NO. 2, with one emery wheel point\$16.50

Dremel HIGH - SPEED STEEL CUTTERS and balanced wheel points are available for all makes of hand grinding tools.

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DREMEL MFG. CO. Dept. 223-D **RACINE, WIS. U.S.A.**



Line drawing of new Lindberg West Coast Plant in Downey, California

Lindberg Announces Opening of New West Coast Plant

Lindberg Engineering Co., Chicago, Ill., has announced the opening of its new West Coast plant located at 11937 S. Regentview Ave., Downey, Califor-

nia. The new factory comprises 12,000 square feet of production and office space and will be used to manufacture industrial heat-treating furnaces and other Lindberg products used in aircraft and other West Coast industries.

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LARGEST BUSHING SELECTION

Features **2** Standards
A.S.A. Plus Acme

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Easy... Fast!



Simplifies, speeds bushing selection. Packed with valuable data. Saves you time and trouble. Also includes liners, leader pins, dowel pins, locating jigs, etc.

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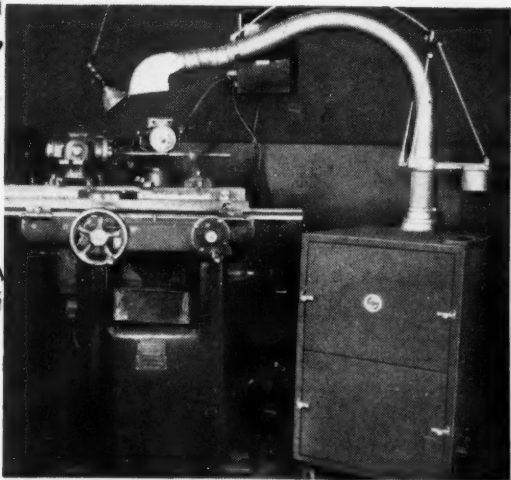
ACME

INDUSTRIAL COMPANY

212 N. Laflin St., Chicago 7, Illinois

MANUFACTURERS OF STANDARDIZED DRILL JIG AND FIXTURE BUSHINGS

This **TORIT DUST COLLECTOR** Gets Around to Get Results



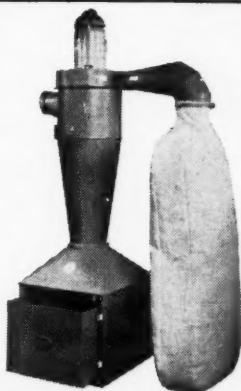
In this shop, doing specialized work, several grinding and cutting machines were used intermittently. Odd shapes and sizes, too, were involved. Here the dust problem was solved with a mobile Torit Dust Collector that could be moved as necessary. A Torit flexible suction tube assembly insured nozzle adjustment to the position best suited for the work being done.

Standard model Torit Dust Collectors meet the requirements of most dust collecting operations, and special adaptations can be quickly fabricated. Compact and self-contained they are very economical to install, low in operating costs and very easy to maintain. For details write:

see our catalog in



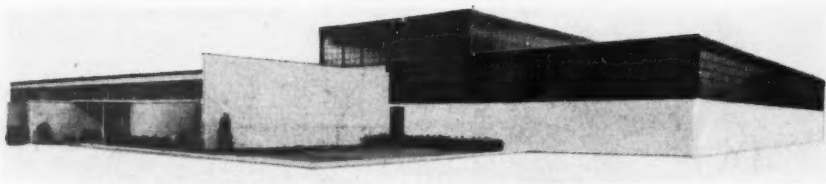
or write for copy



Torit also manufactures a line of cyclone type dust separators. Sizes up to 5 H.P., with or without after-filters.

TORIT **MANUFACTURING CO.**

296 Walnut St. St. Paul 2, Minn.



New plant of Royal Oak Tool & Machine Co., Royal Oak, Michigan

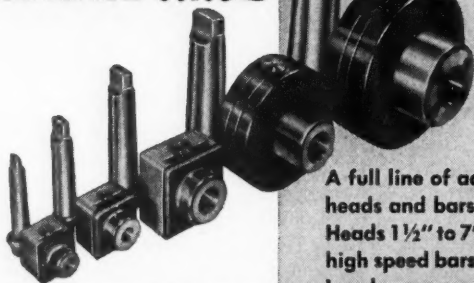
The new facilities were constructed to provide better servicing operations and to speed deliveries.

Royal Oak Tool & Machine Company Completes New Plant

Royal Oak Tool & Machine Company has announced the completion of a new plant which is located on a 5-acre tract at 29800 Stephenson Highway, Royal Oak (Detroit), Michigan. The building, which is completely enclosed with a

cyclone fence, provides for 17,600 square feet of space and incorporates 5,600 square feet of glass which is tinted on the eastern, southern, and western sides. The lighting is a combination of fluorescent and incandescent fixtures. The plant has 14-foot side bays and a 22-foot center bay and utilizes a 5-ton crane with a 5-ton hoist. The grinding room is completely enclosed and is equipped with an underground dust collecting system. The plant floors are wood block.

**for greater RIGIDITY
more ACCURATE cuts**



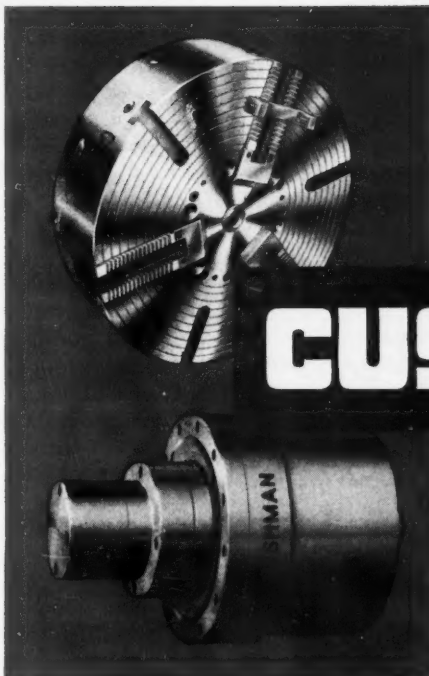
**use
CRITERION**

**CRITERION
machine
WORKS**

**BORING
HEADS**

A full line of adjustable boring heads and bars now available. Heads 1½" to 7" dia. Carbide or high speed bars ¾" to 1¼" dia. Lead screws ground AFTER HARDENING. Ample bearing surface, heat treated parts, interchangeable shanks. Criterion tools are the criterion. Write for free catalog and costs.

9312 SANTA MONICA BLVD. • BEVERLY HILLS, CALIF.



CONSERVE YOUR
MAN-POWER

YOU CAN'T MACHINE IT
ECONOMICALLY UNLESS
YOU HOLD IT RIGHT

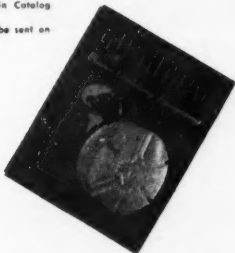
CUSHMAN

AIR CHUCK EQUIPMENT

There is a correct type of standard or special chuck and jaw equipment for every chucking job. Cushman's background of experience in this specialized field can usually help you find it and thus save time and money, while frequently simplifying set-up methods.

This is especially true in the comparatively new field of AIR CHUCKING. Cushman's very complete line of Precision Air-Operated Chucks, High Speed Air Cylinders and Accessories, and the Cushman Power Wrench, offers almost unlimited possibilities in tooling for economy and speed without sacrifice of quality. Our engineers will welcome your problems.

The Cushman Power Chuck Catalog No. PO-64MS covers our complete line of Air Chucks, Air Cylinders, and Accessories . . . Cushman Manually-Operated Chucks are separately described and listed in Catalog No. 64MS. Either or both will be sent on request.



THE CUSHMAN CHUCK COMPANY
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Chucking Engineers Since 1862

Manufacturers of

AIR CHUCKS, CYLINDERS, and
ACCESSORY EQUIPMENT • THE CUSHMAN
POWER WRENCH • CUSHMAN MANUALLY-
OPERATED CHUCKS and FACE PLATE JAWS

A WORLD STANDARD FOR PRECISION

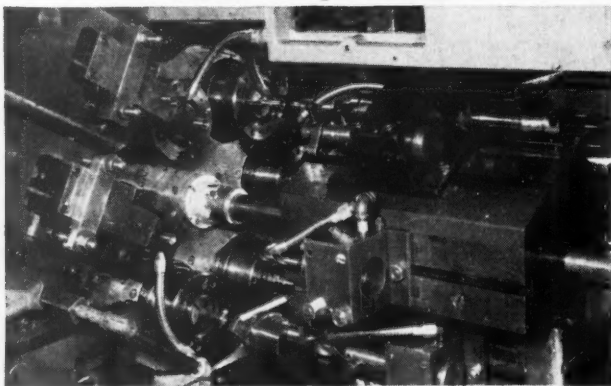
17th Annual Machine Tool Electrification Forum

The 17th Annual Machine Tool Electrification Forum, sponsored by the Westinghouse Corporation, is scheduled to be held in Buffalo, New York, on April 14 and 15, 1953. The first day's sessions will be held in the Hotel Statler and the second day's sessions at the Motor and Control Division of Westinghouse. Because of the rapidly

growing interest in automation in all its aspects, a special "give-and-take" discussion-type paper will cover the automation requirements of the large users of machine tools, as well as how the machine tool builder can meet these requirements. Members of the Ford Motor and Heald Machine Companies will conduct this discussion.

Other tentative papers will cover such subjects as "Automatic Loaders

CMH *Stay-Put* FLEXIBLE METAL COOLANT HOSE holds its position



CMH Stay-Put Flexible Metal Coolant Hose maintains any adjusted position for conducting coolant to work in process. It is leakproof and can be bent to any desired position by light hand pressure. Furnished in standard lengths and with a choice of fittings. For full details, write for bulletin.

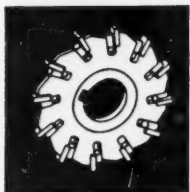
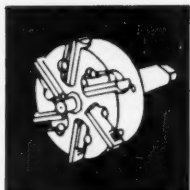
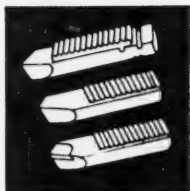
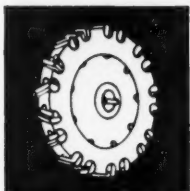
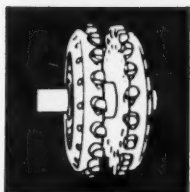
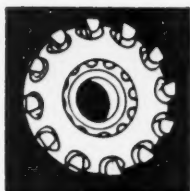


CHICAGO METAL HOSE DIV. FLEXONICS CORPORATION

1373 S. Third Avenue, Maywood, Illinois
Manufacturers of flexible metal hose and conduit,
expansion joints, metallic bellows and assemblies
of these components.

In Canada: Flexonics Corporation
of Canada, Ltd., Brampton, Ontario

for LeBlond Crank Shaft Lathes," "Application of Telephone Equipment to Machine Tool Control," "Vibration Mounting of Standard Motors for Precision Grinding Applications," "Report of the Electrical Committee—National Machine Tool Builders Association," "A New Control Relay," "Unique Problems and Solutions," "Coordination of Electric, Hydraulic, Mechanical, and Pneumatic Elements of Machine Tool Design," "NEMA Re-Rate Program," and "European Design of Electric Equipment and International Standards."



8 REASONS WHY...

Lovejoy Cutters are your best buy!

Lovejoy milling cutters offer eight important advantages which help you achieve maximum accuracy, dependability, production and profit from your milling machines.

- 1 All Lovejoy cutters are insert-tooth type. Only worn out blades need be replaced — not the entire cutter.
- 2 Serrations are on front of each blade — plain back makes full contact with body.
- 3 Positive-locking device on the blades assures rigidity, even on heavy intermittent cuts.
- 4 Advancing, replacing and sharpening of blades is fast and accurate.
- 5 Extra rugged blade and body design assures maximum results.
- 6 H. S. S., alloy and carbide-tipped blades available promptly from stock.
- 7 Lovejoy design is tops for blade interchangeability.
- 8 Lovejoy has had 35 years of experience — can help you get best results from your milling operations.

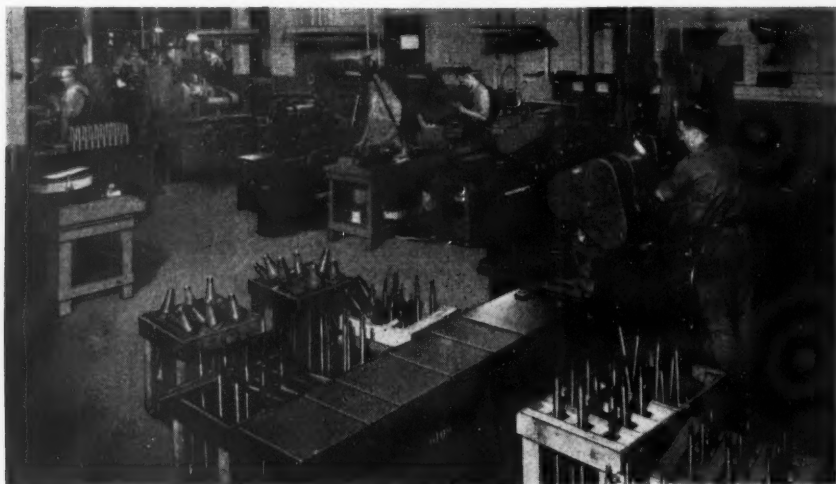
Write for free catalog!



130 MAIN ST., SPRINGFIELD, VERMONT

LOVEJOY

TOOL COMPANY, INC.



Outside diameter grinding department in the new section of the Scully-Jones plant

Plant Addition and Rearrangement Help Scully-Jones Solve Production and "Flow" Problems

Scully-Jones & Company, manufacturer of more than 60 different production tools, has recently completed an extensive expansion program in its present Chicago location. The program includes a new building that adds 14,000 square feet to supply much needed space for manufacturing, storage, and shipping, and a relocation of production equipment to reduce material handling, facilitate "flow," and release

space required for office, engineering, service, and sales departments. Another addition made possible by the expansion is a combination cafeteria and recreation room for workers, as well as an adjoining display area for exhibiting the latest Scully-Jones products.

The new addition and plant rearrangement are part of a long-range program by the company that will also include other developments, as well as new or improved products and production techniques. The purpose of the

LUERS

PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

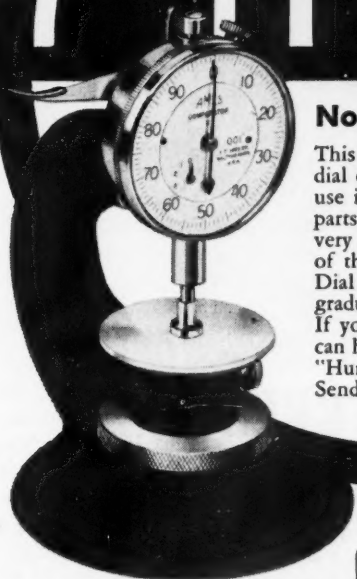
ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

J. MILTON LUERS, 12 Pine Street, Mt. Clemens, Mich.

Produced under License Issued by John Milton Luers Patents Inc.

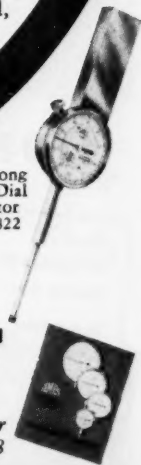
AMES



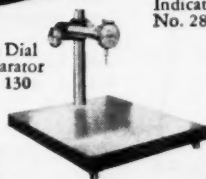
No. 2 Dial Comparator

This is smallest in the Ames' line of high quality dial comparators. It is ideal for desk or bench use in the fine inspection of small precision parts. Light in weight, its broad base makes it very stable. The capacity approximates that of the regularly supplied Ames No. 202 Dial Indicator which has a 0-100 dial, graduated in .001", with a .250" range. If your job requirements differ, you can have the No. 2 with any Ames "Hundred Series" Dial Indicator. Send for details.

Ames Long
Range Dial
Indicator
No. 2822



Ames Dial
Comparator
No. 130



Ames Caliper
Gauge No. 12B



Ames Dial
Micrometer
No. 516

Send today for your
free copy of Catalog No. 58

Representatives in
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B. C. AMES CO. 29 Ames Street
Waltham 34, Mass.

Mfgr. of Micrometer Dial Gauges • Micrometer Dial Indicators

expansion program is to improve deliveries, raise quality standards still further, and improve employee well-being.

Fourteenth Summer Management Course

The College of Engineering, State University of Iowa, has announced the

14th Summer Management Course which is scheduled to be held June 15 through 27, 1953, in Iowa City. The intensive course is designed to enable factory managers, foremen, industrial engineers, methods and time-study analysts, cost accountants, and office executives to increase their understanding of the design and application of the major management techniques. The

fields of production planning, job evaluation, motion and time study, wage incentives, plant layout, materials handling, quality control, supervisory training, labor relations and legislation, organization and policy, and public speaking will be covered in the course.

The regular State University of Iowa teaching staff will be augmented by outstanding men from a variety of industries and other educational institutions. Communications concerning the course should be sent to Wayne Deegan, 113 Engineering Building, State University of Iowa, Iowa City, Iowa.

Etch Iron, Steel or Their Alloys



Easy as writing with a pencil!

IDEAL *Electric* ETCHERS

More reliable than tags, far cheaper than special plates. Portable—safe—fast! Repays low cost dozens of times over in time and money saved. "Universal" Model (shown) has 4 etch heats—120 to 700 watts. Other sizes for all sizes of work.

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1031 Park Ave., Sycamore, Illinois
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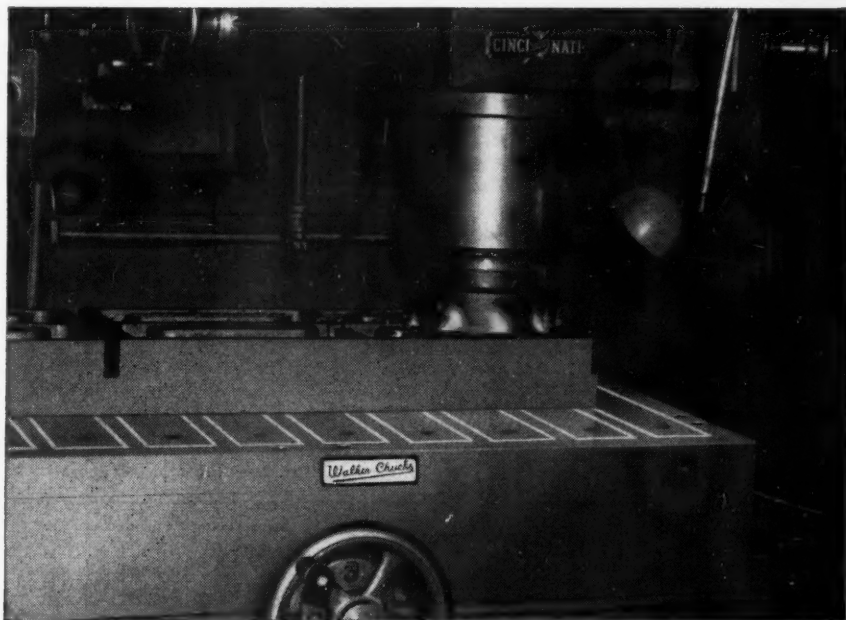
Burn a Permanent Mark for

Model Nos.
Hardness Tests
Inventory Data
Gauge of Metal
Identifying Tools, Jigs, Dies

Parts Nos.
Sizes
Dozens of Uses

TRY IT OUT!

Walker Does It Again—



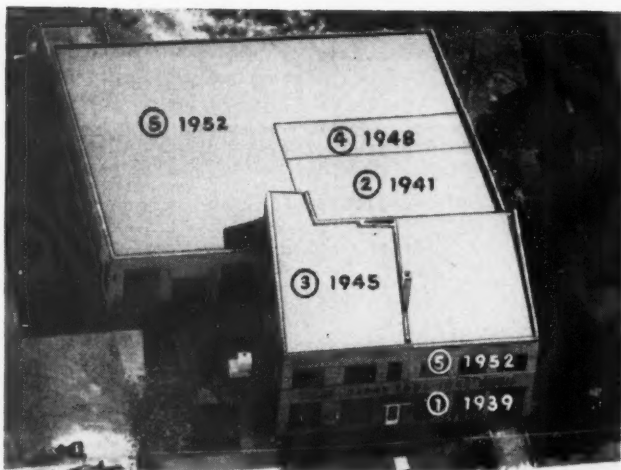
Milling machine operating a carbide cutter 660 f.p.m.; table feed 25 i.p.m. on rough steel castings. Walker Magnetic Chuck, securely holding workpiece, increases production equivalent to work of four planers. Take advantage of modern Walker methods for increasing production, reducing cost.

O. S. WALKER CO. Inc.

WORCESTER 6, MASSACHUSETTS

Original Designers and Builders of Magnetic Chucks

In Canada — Upton Bradeen & James, Ltd.



Aerial view showing additions to Zagar Tool Company's original building in Cleveland, Ohio.

Zagar Tool Expands

Shown in the accompanying illustration are the various additions made by Zagar Tool Co., Cleveland, Ohio, to

sions by a total of 2,000 square feet. The company claims that the expansion program was made to facilitate meeting the demands for its line of



New XL BOND

FOR CARBIDE TOOL AND CUTTER GRINDING

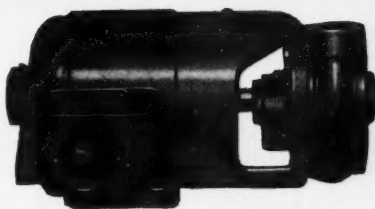
"XL" is Chicago Wheel's exclusive new bond for silicon carbide vitrified grinding wheels, especially made for grinding carbide cutting tools. Supplied in most popular sizes and steel backs. Prompt delivery. Keep your production up . . . costs down, with "XL."

Write today for information—Dept. MMS

CHICAGO WHEEL & Mfg. Co.

1101 West Monroe St., Chicago 7, Illinois
OFFICES IN PRINCIPAL INDUSTRIAL CENTERS

NOT TOO LITTLE...
NOT TOO MUCH...BUT
JUST ENOUGH
COOLANT



MODEL AG3M

Belt driven $\frac{1}{4}$ hp through
AG7M 1 hp.

Pipe sizes: $\frac{3}{8}$ " to $1\frac{1}{2}$ ".

Direct or motor drives: capacities $\frac{1}{4}$
hp 25 gpm to 1 hp 90 gpm; pipe sizes
 $\frac{3}{8}$ " to $1\frac{1}{2}$ ".

Let the FULFLO engineers help. Write
(on your letterhead, please) for your
professional copy of

FULFLO MECHANICAL DATA BOOK



**CENTRIFUGAL
COOLANT
PUMPS**

1. Be sure you're using the right type of coolant . . .
2. Bring it to the right spot, pumped and circulated by the FULFLO PUMP designed for the purpose. That's good, sound engineering advice on how to **KEEP TOOLS COOL AND MAKE THEM LAST LONGER.**



THE FULFLO SPECIALTIES CO. Inc.
BLANCHESTER, OHIO

multi-spindle drill heads, special drilling machinery, broaching equipment, and collet production tools.

Bullard Opens Six New Field Sales Offices

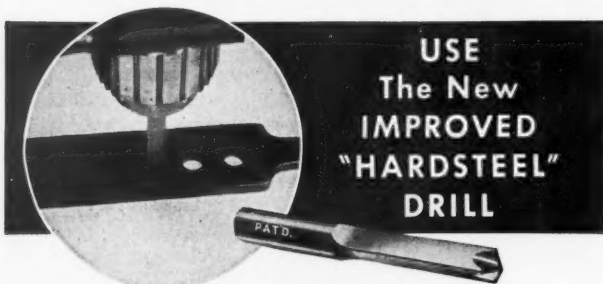
The Bullard Co., Bridgeport 2, Conn., has announced the opening of six new field sales offices in the Chicago, Detroit, and Boston districts. In the Chicago district, the location of the offices

and the personnel in charge are Clifford H. Hagberg and James L. Shay, 6645 W. North Ave., Oak Park, Ill.; Edward C. Roy, 5625 W. Wells St., Milwaukee, Wis.; and Henry J. Malin 2322 Third Ave., Rock Island, Ill. The location and the personnel in charge of the new offices in the Detroit district are Lawrence J. Berglund, 2216½ N. Meridian St., Indianapolis, Ind.; and David C. Berglund, 436 N. Michigan St., South Bend, Ind. Charles E.

Alling, 336 Washington St., Wellesley Hills, Mass., will head the new office in the Boston district.

The new offices are part of a general plan to increase the efficiency of the Bullard sales organization. According to the company, a concentrated effort is being made to provide adequate coverage in the specified areas with a view to providing the best engineering assistance possible to customers in the use of Bullard-built machine tools. Other Bullard sales offices are located in Cleveland, Dayton, Detroit, Philadelphia, Pittsburgh, and Syracuse.

Drill Hardened Steels without Annealing —



With the new, improved "HARDSTEEL" Drill, you can do accurate, smooth drilling, countersinking, counter-boring and reaming in steels hardened by any process without first annealing the work. And they work with equal ease on work-hardening steels and high carbon-high chrome steels of any degree of hardness.

"HARDSTEEL" Drills fit standard drill presses. They save time and reduce rejects. They permit engineering changes requiring additional drilling after hardening. And parts drilled after hardening always match at assembly. Write for a copy of the "HARDSTEEL" Operators Manual showing how "HARDSTEEL" drills are cutting costs in thousands of plants.

**You Harden It—We'll Drill It—
With "HARDSTEEL"**

BLACK DRILL COMPANY, INC.
1372 East 222nd St. • Cleveland 17, Ohio

Also makers of—
**BLACK DRILLING
UNITS—AUTOMATIC,
SELF-CONTAINED—
FOR COST-CUTTING
PRODUCTION ON
ALL MATERIALS**

Write for information

L-W

SWIVEL BASE MILLING MACHINE VISES

THESE VISES CAN TAKE IT!
They're Built for Brute Strength
and Accuracy . . . yet
ARE REALLY LOW PRICED!

Ideal for drill press and shaper work.

High-grade semi-steel castings. Hardened steel sliding jaws with full length bearing on a ground bar and machined ways. The 4 1/2" and 6 1/2" sizes have a large Acme steel screw with replaceable bronze nut. Four bolt and key slots for rigidly attaching to table so the work-holding surfaces are at true right angles or parallel to the table.

HUSKY \$21.85

Jaws 3" wide, 1" deep. Opens 2" with jaws. Wt. 16 lbs.

JUNIOR \$36.55

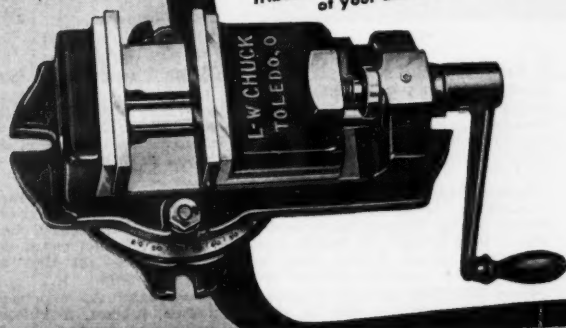
Jaws 4 1/2" wide, 1 3/4" deep. Opens 3" with jaws, 3 1/2" without. Wt. 40 lbs.

MASTER \$54.56

Jaws 6 1/2" wide, 2" deep. Opens 4" with jaws, 5 1/4" without. Wt. boxed 85 lbs.

Immediate Delivery

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Send for complete catalog giving prices and specifications on these quality, low-cost L-W Products



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MAGNETIC CHUCKS



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POWER RACKS



MACHINE

L-W CHUCK COMPANY

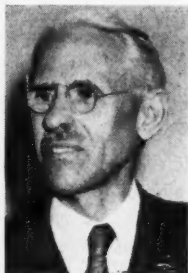
28 SO. ST. CLAIR ST.
TOLEDO 4, OHIO

Jacob D. Cox, Former President and Board Chairman of Cleveland Twist Drill, Dies

Jacob D. Cox, president of The Cleveland Twist Drill Company from 1919 until last November when he became chairman of the board, died recently at the age of 71. Mr. Cox was active for many years as a director of

The Cleveland Trust Company. He was also a past president of the National Metal Trades Association and a director and past president of the Associated Industries of Cleveland. He was also a trustee of St. Luke's Hospital, Fenn College, and Case Institute of Technology, all of which are located in Cleveland.

Employee relations occupied much of Mr. Cox's attention. He pioneered in the installation of one of the first profit-



Jacob D. Cox

sharing plans in 1915 to implement his belief that the interests of both owners and employees of a business were mutual. Under his leadership, the company received the first joint Army - Navy Award to be presented during World War II for outstanding production achievement.

HERE'S THE ANSWER TO INCREASED PRODUCTION!

CARBIDE TOOLS

SEND TODAY FOR YOUR FREE COPY OF THE NEW 48 PAGE NELCO CATALOG!

Get the graphic story . . . Nelco carbide tools assure faster, better, more profitable production.

Nelco Tool versatility—actually your assurance of *special tools at standard prices*—is shown in the nearly 800 carbide cutters Nelco regularly maintains in stock. In the Nelco line of 4 flute end mills alone, there are available 63 standard cutters in diameters from $\frac{3}{8}$ " to 2".

Diamond-hard carbide swiftly chews through the toughest metals—works to closer tolerances and leaves finer finishes than conventional cutters. Higher table feeds mean **MORE** production. Costly down time is slashed! Nelco tools stay sharper longer—mill more pieces per grind. Nickel shim brazed carbide tips on alloy steel bodies mean year after year of service free operation.

Nelco **SERVICE** extends directly into your plant! An experienced Nelco field engineer will be glad to discuss, suggest, troubleshoot *in your plant, on your machines*.

Unusual, out of the ordinary tools described in this catalog can be designed or built to your specifications by Nelco carbide technicians.

NELCO TOOLS

For that Extra **EDGE** in Production

NELCO TOOL COMPANY, INC. MANCHESTER, CONNECTICUT

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COMPANY

"HARD TO FIND TOOLS FOR STOCK DELIVERY"

Why Wait for SPECIAL TAPS?

we have them in STOCK for IMMEDIATE DELIVERY

HIGH SPEED

SPECIAL

RIGHT HAND TAPS



SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
4	32-48-60-64	7/16	12-16-18-22-24-27-28-30-32-36-40	1-9/16	18-20-24
5	30-32-36-48-80	1/2	12-14-16-18-22-24-26-27-28-30-32-40	1-5/8	5 1/2-8-10-12-13-16-18-20-24
6	36-40-48-56-60	9/16	16-20-24-27-28-30-32-40-48	1-11/16	10-12-14-16-18-20-24
7	32-40	5/8	12-14-16-20-24-27-28-32-36-40	1-3/4	8-10-12-14-16-18-20-24
8	24-30-36-38-40-44-48	11/16	11-16-18-20-24-27-28-30-32	1-13/16	8-10-12-14-16-18-20
9	24-28-32-40			1-7/8	8-10-12-14-16-18-20-24
10	28-30-36-40-48-64			1-15/16	8-10-12-14-16-18-20-24-28
12	20-28-32-36	3/4	9-11-12-14-18-20-24-26-27-28-32	2	4 1/2-8-10-12-16-18-20
14	20-24-28	13/16	10-14-18-20-32	2-1/16	12-14
1/16	60-64	7/8	10-12-16-18-20-24-27-28-32	2-1/8	12-16-20
5/64	72	15/16	8-9-10-12-14-16-18-20-24-32	2-3/16	12-16
3/32	48	1	10-12-16-18-20-24-27-32-40	2-1/4	4 1/2-8-12-14-16-18
7/64	48-56	1-1/16	12-14-16-18-20-24	2-5/16	12-18
1/8	32-40	1-1/8	8-10-14-16-18-20-24-32	2-3/8	12-16-18
5/32	32-36-40	1-3/16	8-10-12-14-16-18-20-24	2-1/2	8-10-12
9/64	36-40	1-1/4	8-10-14-16-18-20-24-32	2-9/16	18
11/64	36	1-5/16	12-14-16-18-20-24-32	2-5/8	12-16-20
3/16	20-24-32	1-3/8	8-10-14-16-18-20-24	2-3/4	16
13/64	32	1-7/16	8-10-12-16-18-20-24	2-7/8	8-12-16
7/32	24-28-32	1-1/2	8-10-14-16-18-20-24-28	3	8-16
1/4	18-24-26-27-30-32-36-40			3-1/4	8-12-16
5/16	16-20-22-27-28-32-40			3-1/2	8-12-16
3/8	12-16-18-20-27-28-32-36-40-48			3-7/8	6
				4	8-12

HIGH SPEED LEFT HAND TAPS

SIZE	THREAD	SIZE	THREAD	SIZE	THREAD
0	80	3/8	16-24-32	1-3/8	6-8-10-12-16-18-20-24
1	56-64-72	7/16	14-20-28	1-7/16	8-10-12-14-16-18-20
2	56-64	1/2	12-13-20-28	1-1/2	6-8-10-12-16-18-20
3	56	9/16	12-18-20-24	1-9/16	8-10-12-16-18-20
4	32-36-40-48	5/8	11-12-18-20-24	1-5/8	8-10-12-14-16-18-20
5	40-44	11/16	11-16-24	1-11/16	8-10-12-14-16-18-20
6	32-36-40	3/4	10-16-18-20	1-3/4	8-10-12-14-16-18-20
8	32-36-40	13/16	16	1-13/16	8-10-12-14-16-18-20
10	24-30-32-40	7/8	9-12-14-18-20	1-7/8	8-10-12-14-16-18-20
12	24-28-32	1	8-12-14-16-18-20	1-15/16	8-10-12-14-16-18-20
1/4	20-28-32	1-1/8	7-12	2	4 1/2-10-12
5/16	18-20-24-28-32	1-1/4	7-12-16-18		

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NOTE: Oversize—Undersize—Metric—64th—and
32nd Size Taps Available for Quick Delivery.

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New plant of Precision Diamond Tool Company near Elgin, Illinois

Precision Diamond Tool Opens New Manufacturing Plant

Precision Diamond Tool Company has announced the recent opening of its new manufacturing plant and offices which are located approximately $\frac{1}{4}$ mile east of Elgin, Illinois, on route U. S. 20. The new plant is on one floor and contains all the latest equipment and machinery necessary to manufacture and control the quality of its wide line of diamond tools and diamond wheels. The increased production facilities provided by the new plant is another in a series of advancements carried out by the company over the past 10 years.

According to Jan Taeyaerts, president of the firm, the new plant will not only ease the pressing need for increased production facilities, but it will also enable the company to incorporate the latest production techniques

to continuously increase the quality of Precision diamond tools. The new location is said to afford two and one half times the floor space previously occupied. The new plant also provides sections for engineering, quality control, and shipping facilities.

R. E. Anderson Named President of Robertson Manufacturing Company

Robert E. Anderson, former executive vice president, has been named president of Robertson Mfg. Co., Trenton, N. J., manufacturer of tile and grinding wheels. He succeeds D. P. Forst who has been named chairman of the board. Mr. Anderson joined the firm as a ceramic engineer 31 years ago and later became assistant factory manager, factory manager, sec-



SPECTRUM

STICK—TUBE—CARTRIDGE
ANY GRIT SIZE

DIAMOND COMPOUNDS

FOR
DIAMOND
MICRO-FINISHING
AND
PRECISION
LAPPING

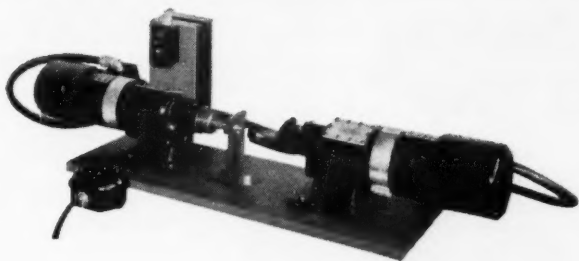
The most complete line of
diamond finishing com-
pounds and accessories.

PENSCO

DIAMOND TOOLS AND
WHEEL DRESSERS
AND DIAMOND POWDERS
PRECISION GRADED
IN ALL GRIT SIZES

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5941 ALMA STREET, PHILADELPHIA 24, PA.



STANDARD OPPOSED DRILLING MACHINE

This Standard Govro-Nelson Drilling Machine is supplied completely wired so that the two Automatic Drilling Units work simultaneously from a momentary contact palm or foot switch with a dowel hole for fixture location. (Fixture not included.)

With the Units adjustable endwise up to 18" between chucks, it can be used as a centering machine. By mounting a simple hand-index fixture, it can be used for drilling wire holes in cap screws. Two opposed holes can be drilled at once. A riser plate permits the drilling of offset holes.

Why not drill two holes at the cost of one with this standard, versatile machine? Write for literature, sending samples and part prints.

WRITE FOR
Literature

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Machinists of Precision Parts for 28 Years

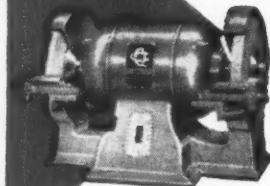
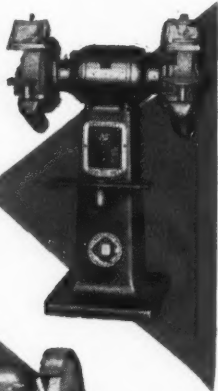
**1933 Antoinette
Detroit 8, Mich.**

Automatic

DRILLING UNIT

"Time Savers in any shop"

**Heavy Duty
Floor Grinder**



**Heavy Duty
Bench Grinder**

Here's extra value in long life, low maintenance and low first cost. QUEEN CITY Bench and Floor Grinders and Buffers have all the quality features . . . ball bearings, heavy duty motors, etc. . . in a complete range of sizes and models . . . all priced far below comparable grinders and buffers.

**QUEEN CITY
MACHINE TOOL CO.**

**WRITE TODAY
FOR DETAILED
LITERATURE**

QUEEN CITY MACHINE TOOL CO.
233 E. 2nd Street, Cincinnati 2, Ohio

retary, and then executive vice president. A native of Worcester, Massachusetts, Mr. Anderson is a graduate of Ohio State University and resides at 106 Arbor Lea Ave., Morrisville, Pennsylvania.

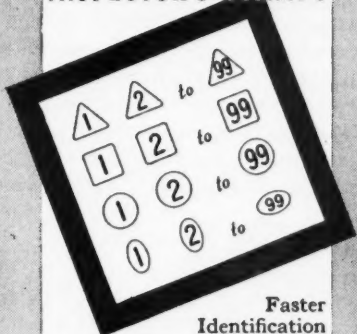
U. S. Drill Head Elects New Officers

The U. S. Drill Head Co., Cincinnati, Ohio, manufacturer of various types of fixed center and multiple-spindle drill heads, elected new officers recently as a result of a change in ownership. A. P. Speckin, former general manager, became the company's president, with J. R. Bashor, vice president, and W. K. Francis, secretary and treasurer. W. C. Moening, former partner, was elected chairman of the board. Organized as a partnership in 1915, the company has since multiplied its production facilities in repeated expansions to meet the current demands for its products.

Independent Pneumatic Tool Company Changes Name

The stockholders of the Independent Pneumatic Tool Co., Aurora, Ill., voted recently to change its 60-year-old corporate name to Thor Power Tool Company. According to Neil C. Hurley, Jr., president, the business has so changed in the past years that the name is no longer descriptive of the company's operations. The trade name "Thor" has been used as identification of all the firm's power tools since 1893, and the new name utilizing the trade mark will help eliminate confusion and facilitate easier recognition of the company's products.

INSPECTOR'S STAMPS

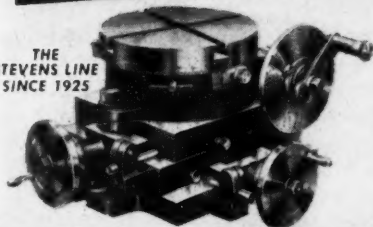


Faster Identification
of Inspectors or Operators.
Different borders may be used
for different shifts. Available
in 4 sizes. Write for prices
today.

NEW METHOD STEEL STAMPS, INC.
145 JOSEPH CAMPBELL DETROIT, U. S. A.

COMBINED TRANSVERSE AND CIRCULAR MOVEMENTS ON STEVENS #1 COMPOUND TABLE

THE
STEVENS LINE
SINCE 1925



Combines $3\frac{3}{4}$ " longitudinal and $3\frac{3}{4}$ " transverse movements with circular movement of $7\frac{1}{2}$ " Rotary Table. • Rotary Table and Compound Table can be used separately. • Larger No. 2 Compound Table also available.

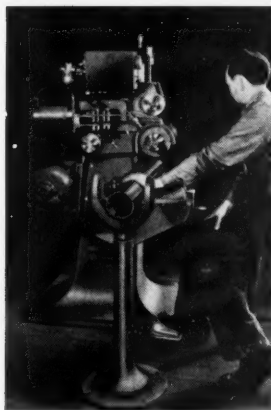
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Rotary Tables • Multiple Spindle Index Centers • Vises • Screw Head Slotters

The John B. Stevens Company
Main Street, Somersville, Conn., U. S. A.

STEEN PIPE AND TUBE CUT-OFF MACHINES

For faster cutting



If you cut pipes and tubes . . . in small or large quantities . . . you can cut faster—easier—with a Steen Cut-Off Machine. Available in hand and automatic air-operated models for pipes and tubes up to 12" diam. Also, Manufacturers of Cut-Off Wheels . . . Chaser and Wheel Grinders. Request Circulars Today.

Continental MACHINE CO.

SINCE 1919

1932 N. MAUD AVE. • CHICAGO 14, ILL.

Timken Announces Multi-Million Dollar Expansion Program

The Timken Roller Bearing Co., Canton, Ohio, has announced a multi-million dollar expansion program for its Bucyrus, Ohio, plant. A new toolroom will be constructed to house the maintenance, repair, electrical, and sheet metal departments, as well as all stores. This building will measure 100 feet wide x 220 feet long with a clearance under the trusses of 16 feet. At-

tached to the toolroom will be an office building measuring 40 x 100 feet to provide space for the plant management, accounting, personnel, and medical departments.

A locker room and cafeteria building is also scheduled to be constructed. The locker room will have facilities for 850 employees and the fully-equipped cafeteria will have a seating capacity of approximately 150 persons. The total area of this building is approximately 8,000 square feet.

Another important part of the program is a new boiler plant which will be designed to supply steam for heating, as well as for process purposes. Two boilers will be used, each provided with three alternate methods of firing—coal, oil, and gas. New machinery and production equipment for the manufacture of bearing parts will be installed in the plant. The cost of the new equipment, it is claimed, will be approximately two million dollars. The proposed production facilities are expected to be in full operation by the end of next year.

For
"On the Spot"
DELIVERY ... from **STOCK**
Chicago

"V"--BELT DRIVES

Over 100,000
fractional H.P.
pulley are
carried in stock
for your immediate delivery.

Sizes range from 1 1/2 to 14"
in diameter for "A" - "B"
and "O" section V-belts.
Make our stockroom
your warehouse when
you specify

Chicago
V-BELT DRIVES.

Construction: All pulleys are Die Cast from the best grade of zinc base alloy, then are accurately finished to give you years of satisfactory service.

For complete information write for Catalog No. 6752.

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Chicago **DIE CASTING MFG. CO.**
2510-14 WEST MONROE STREET
CHICAGO 12, ILLINOIS



HOWALD CARBIDE MILLING CUTTERS



PATENTED
END MILL

- SQUARE BLADES Easily Replaced.
- Simple, Accurate Blade Adjustment.
- Lowest Blade Cost.
- Cutters from 1½" to 14" dia.



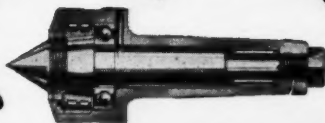
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SHELL
MILL

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W. T. HOWALD
MACHINE WORKS

182 SIGOURNEY ST., BROOKLYN 31, N. Y.

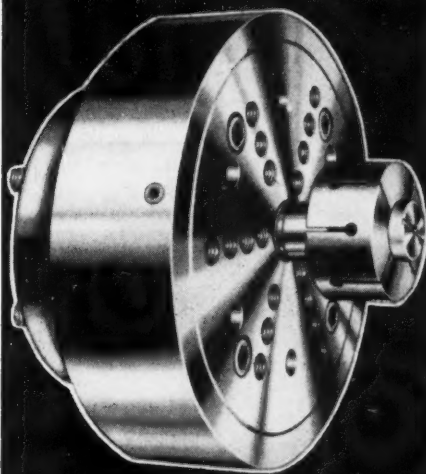
NIELSEN Heavy Duty Live Centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

Write for catalog
M on live centers

NIELSEN, INC. LAWTON, MICHIGAN



9 Reasons for You to get the Facts on SPEEDGRIP CHUCKS

1. They increase production.
2. They give greater accuracy.
3. Set-up time is shorter.
4. They are safer to operate.
5. First cost is low.
6. Maintenance cost is low.
7. Design is simple.
8. Guaranteed to do the job.
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Speedgrip Precision
Internal Chucks will save
you money on second
operation work.

WRITE FOR FREE MANUAL



SPEEDGRIP CHUCK

820 N. WARD STREET
ELKHART, INDIANA

Metal-Working News in Brief

Adamas Carbide Corp., Harrison, N. J., has announced the opening of a new \$250,000 stock of standard tungsten carbide in Dearborn, Michigan. The **Quint-Alloy Corporation**, Adamas representative in Michigan, will handle the stock in its new headquarters located at 24141 Ann Arbor Trail, Dearborn, Michigan.

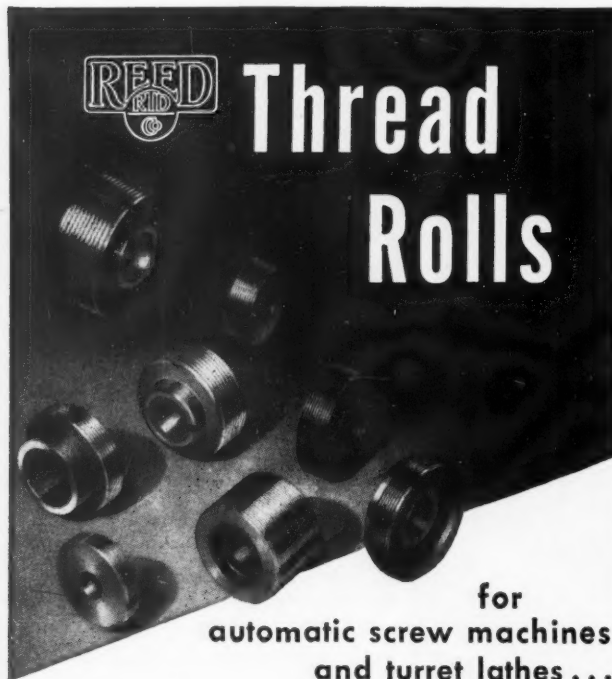
At the annual meeting of the board of directors, The Taft-Peirce Mfg. Co., Woonsocket, R. I., elected two new corporation officers. **Robert S. Ford**, manager of home office sales, was elected deputy assistant secretary, and **Lafayette A. Hays** was elected deputy assistant treasurer. Mr. Ford has been associated with the company since 1942, and Mr. Hays has been chief accountant for the company since 1939.

— o —

The Turchan Follower Machine Co., Detroit, Mich., has announced the promotion of **Gale S. Humes** to general manager, **Otto C. Turchan** to sales manager, and **Demeter Kiurski** to chief engineer.

— o —

Fonda Gage Co., Inc., Stamford, Conn., has announced that all sales of the company will be made through **Fonda Gage Sales Corp.**, 38 Broad St., Port Chester, N. Y. **Robert A. Manes**, former sales manager of Fonda Gage Company, Inc., has been appointed president of the new Fonda Gage Sales Corporation.



Thread Rolls

for
automatic screw machines
and turret lathes...

— produce uniform accurate threads economically.

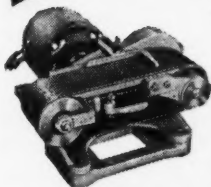
REED ROLLED THREAD DIE CO.

Manufacturers of
THREAD ROLLING MACHINES and DIES • KNURLS • THREAD ROLLS
Worcester, Massachusetts, U. S. A.

D 252

**DOES IT BETTER
DOES IT FASTER**

SIMPLEX-M ABRASIVE BAND GRINDER



The precision of a machine tool plus the durability of a workhorse. Complete with 1/2 H.P. Heavy Duty Motor and auto-

matic band tension control. Nothing like it for finishing metals, plastics, wood, fibre, etc.

OTHER STYLES AND SIZES IN NEW
MANUAL ON FINISHING—WRITE TODAY

WALLS SALES CORP.

333 Nassau Avenue, Brooklyn 22, N. Y.

**relief
valves**


for
**AIR-
WATER-
OIL-
GASES-**



1/8"
to
1"

**automatic
holds setting
positive relief**

WRITE FOR CATALOG

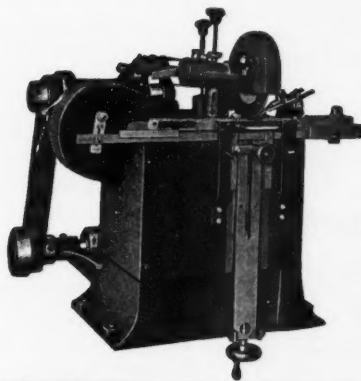
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C. A. CO. 

3435 So. Elati St., Englewood
In Colorful Colorado

Valves • Filters • Regulators
Lubricators • Hose Assemblies

Here's the sharpener that triples your saw mileage

E C Automatic Combination Hack —Band—Circular Saw Grinder



An exclusive feature enables one grinding wheel to sharpen and shape a variety of teeth without changing shape of wheel.

This grinder sharpens and reclaims hack saws that would otherwise be discarded.

Write for details.

WARDWELL MANUFACTURING CO.
3166 Fulton Road Cleveland 9, Ohio



WARDWELL

Maker of largest line of
saw and tool sharpening machines

Metal-Working News in Brief

Simonds Abrasive Co., Philadelphia 37, Pa., has announced the appointment of **E. F. Mitchell** as Detroit district manager, with headquarters located at the company's branch office and warehouse located at 17155 Conant, Detroit 12, Mich. Mr. Mitchell was formerly a sales representative in the Michigan territory.

The appointment of **Thomas F. Sears Co.**, 4085 Valerie, Bellaire, Texas, as exclusive representative to handle sales and engineering service of the complete line of Pioneer and Rollway centrifugal and positive displacement pumps for the states of Texas and Louisiana has been announced by Pioneer Pump, Division of Detroit Harvester Co., Detroit, Michigan.



"M-40-U" ALLOY CENTERS

Give You **PRODUCTION-PROVEN** "DEEP CORE DESIGN"

Get more for your center dollar with Gorham "DEEP CORE DESIGN!" "M-40-U" Alloy Centers are **PRODUCTION-PROVEN** in the largest plants. They consistently outlast high-speed and other alloy centers, stand far more abuse. Although equal to carbide in wear resistance, they cost less, are easier to redress.

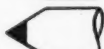
And Gorham's exclusive "DEEP CORE DESIGN" allows many more redressings, too! A core of "M-40-U" Alloy, developed by Gorham expressly for wear, abrasion and heat resistance, is induction brazed deep in the shank, after which the entire center is finish ground, giving you wear material permanently supported by tough shank steel!

Gorham "M-40-U" Alloy Centers are available with Morse, B. & S. or Jarno taper shanks. Immediate delivery on popular sizes, "specials" to specification. Free literature gives description, dimensions, prices. Send for your copy today.

NOT JUST
A CAP



NOT JUST
A TIP



BUT A DEEP,
SOLID CORE!



"DEEP CORE DESIGN"

Gorham TOOL COMPANY

"EVERYTHING IN STANDARD AND SPECIAL CUTTING TOOLS"

14414 WOODROW WILSON • DETROIT 3, MICHIGAN
WEST COAST WAREHOUSE: 576 North Prairie Ave., Hawthorne, Calif.



— 0 —

The Taft-Pierce Mfg. Co., Woonsocket, R. I., has announced the appointment of **Jesse E. Deacon** as assistant superintendent of the Contract Division. He will be succeeded as foreman of the Propeller Shaft Department by **Russell W. Grabinsky**.

— 0 —

Stewart E. Wright has been appointed vice president in charge of sales in all divisions of the Schauer Mfg. Corp., Cincinnati, Ohio. Before joining Schauer in 1945, Mr. Wright was general sales manager of the National Telephone Supply Company in Cleveland.



WHO

MAKES THE FINEST
 COUPLING BOLTS • CAP SCREWS
 MILLED STUDS • SET SCREWS

** Wm H. Ottemiller co.*
 YORK, PENNA.

Write for name of nearest distributor
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Over 85% of the torque wrenches used in industry are

Sturtevant
TORQUE WRENCHES

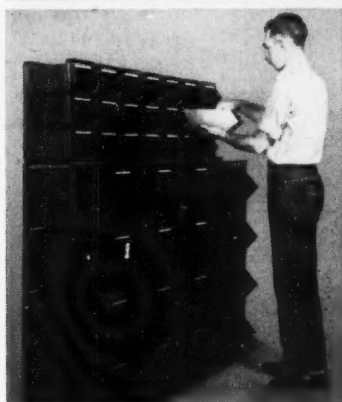
Read by Sight, Sound or Feel

- Permanently Accurate
- Practically Indestructible
- Faster—Easier to use
- Automatic Release
- All Capacities

in inch ounces
 ... inch pounds
 ... foot pounds
 All sizes from
 0-4000 ft. lbs.

Every manufacturer,
 design and production
 man should have this valuable data. Sent upon request.

PA. STURTEVANT CO.
 ADDISON [QUALITY] ILLINOIS



REDUCE HANDLING of Tools, Parts and Materials

Because Stackbins are portable containers — not fixtures — tools, parts and materials can be carried to departments, from machine to machine, or held in stockrooms without being transferred from one container to another. Stored in Stackracks, any Stackbin is instantly accessible when its contents are needed — without disturbing any other bin. *Stackbins* — individual hopper-fronted stacking bins, slide like drawers in *Stackracks* — individual units which lock together to form racks of any size, shape or capacity.

**STACKBINS
 IN
 STACKRACKS**

Manufactured and sold in Canada exclusively
 by Wickware-Stackbin, Ltd., Ottawa
 Write Stackbin Corp., 1083 Main St., Pawtucket, R. I.

STACKBIN  **SYSTEM**

"Stacked and Still Accessible"

Metal-Working News in Brief

Elden L. Aufer has been appointed sales manager for Bay State Abrasive Products Co., Westboro, Mass., succeeding **E. Halsey Brister** who has been named to the new post of director of product development and quality control. Mr. Aufer was formerly district manager for the company's Detroit office and warehouse.

A. M. Sargent, founder and former president of Pioneer Engineering and Manufacturing Company who recently resigned his interest in that firm, has announced that he has opened his own consulting engineering office at 10120 W. McNichols Rd., Detroit 21, Mich. Mr. Sargent, a former national president and one of the founders of the American Society of Tool Engineers, has more than 40 years of industrial

experience in every phase of manufacturing from design to cost control.

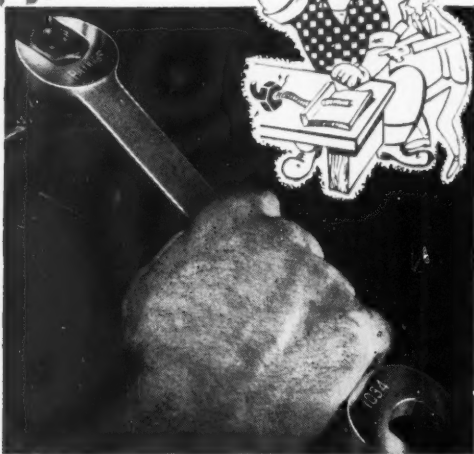
— o —

Hy-Pro Tool Company, with headquarters in New Bedford, Mass., has announced a change in its Detroit address to 19428 W. McNichols Rd., Detroit 21, Michigan.

— o —

Rivett Lathe & Grinder, Inc., Boston, Mass., has announced the appointment of **Genesee Machine Builders, Inc.**, 1732 Hudson Ave., Rochester 21, N. Y., as representative in that area for the Rivett line of air and hydraulic valves and cylinders, as well as power units.

*a **BILLINGS**
will do it better!*



it pays to use

BILLINGS WRENCHES and SHOP TOOLS

Mechanics and production men like Billings quality and high standards of accuracy. They can depend on Billings tools to do the job.

Billings tools—designed and produced by drop forging specialists—save time and money because they last longer.

Billings Industrial Distributors maintain complete stocks of Billings Wrenches and Shop Tools to fill a wide variety of demands.



BILLINGS

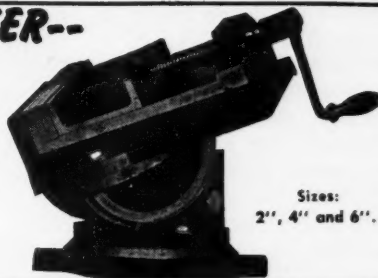
THE BILLINGS & SPENCER CO. HARTFORD, CONNECTICUT

SIZES AND PRICES AVAILABLE FROM YOUR BILLINGS INDUSTRIAL DISTRIBUTOR
WRENCHES • SHOP TOOLS • INDUSTRIAL FORGINGS SINCE 1869

MAKE SET-UPS **FASTER--**

Conserve valuable production time by using the fully universal, easily-operated MASTER MULTI-SWIVEL VISE for intricate, angular set-ups in your shop. Three swivels instantly set any compound angle. Used in shops throughout the world. Interchangeable platen optional.

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DONOVAN MFG. CO.
80 BATTERYMARCH ST., BOSTON 10, MASS.



Sizes:
2", 4" and 6".



IN 11 SIZES—No. 6 to 1"
N.C. In all S.A.E. sizes.



*You Need an Extra Hand Now
to Speed Up Production!*

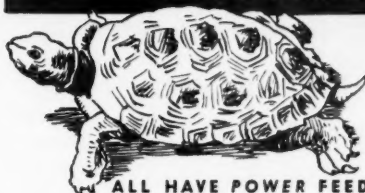
HEIMANN TRANSFER SCREW SETS

Here is the faster, more precise way of transferring open and blind screw holes—make savings in "wage-dollars-per hour" of your expensive hands on every job. A die-and-tool maker's tool with many other applications for die makers and machinists. A set of 6 Hardened Screws nested in combination holder and wrench—no other tools needed. Get more work now—save money tool

HEIMANN MFG., CO. • URBANA, OHIO

SOONER or LATER

YOU WILL COME TO KNOW THAT
"A BORING HEAD THAT WON'T FACE
IS NOT COMPLETE"



SHOWN HERE IS
OUR MODEL "D"
SIX SIZES
AVAILABLE



ALL HAVE POWER FEED FOR FACING
WRITE TODAY FOR COMPLETE DETAILS

CHANDLER TOOL COMPANY, MUNCIE, IND.

RE-
DESIGNED,
MANY
NEW
FEATURES

COMBINED BORING &

FACING TOOL HEADS

Chandler-Duplex

Metal-Working News in Brief

Adamas Carbide Corp., Harrison, N. J., manufacturer of tungsten carbide tool tips, dies, and wear parts, has announced the appointment of **Tool Specialists**, 891 Prospect Ave., Westbury, Long Island, N. Y., as its metropolitan sales representative and **Galvin Machinery Sales**, 561 Glenwood Ave., Buffalo 8, N. Y., as its Buffalo sales representative.

The appointment of **Frank W. Jones** as general sales manager has been announced by **The Bradford Machine Tool Co.**, Cincinnati, Ohio. Mr. Jones will be in charge of sales for both the machine tool and the electric tool divisions.

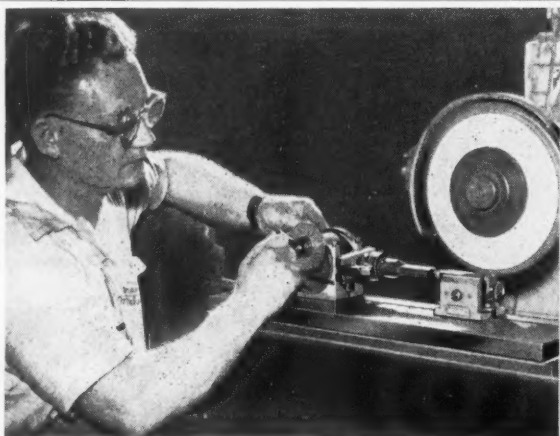
— o —

Standard Pressed Steel Co., Jenkintown, Pa., has announced the opening of a warehouse located at 815 N. Sepulveda Blvd., Los Angeles, Calif., to

serve 11 states and British Columbia. The warehouse will be staffed by **Arthur R. Hansen**, warehouseman, and **Harriet E. Johnston**, secretary. West Coast salesmen **John G. Mahon, Jr.**, **James C. Humphries**, and **David J. Hurford** will work out of the warehouse.

— o —

Kurt Orban Co., Inc., New York 17, N. Y., has announced the appointment of **G D Machine Tool Co.**, Tucker, Ga., as distributor of the company's line of German-made machine tools in Georgia, Tennessee, North and South Carolina, Florida, and Virginia.



MARVIN SURFACE GRINDER DIVIDING HEAD

No. D-1435

Write for complete information
and

The name of your nearest distributor.



MARVIN Machine Products Inc.

414 FORD BUILDING • DETROIT 26, MICHIGAN

**COMPLETE
SPRAYING
UNIT—
ONLY \$15⁹⁵**

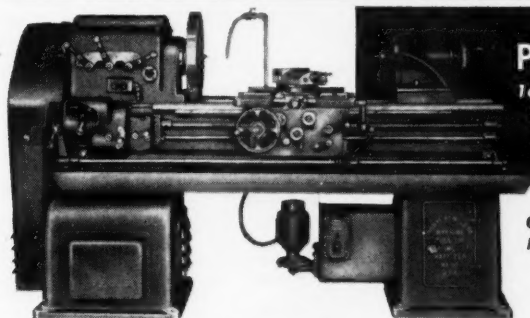


BECKER CO₂ POWERED SPRAY GUN

Shops throughout the country are finding they can't be without this rugged industrial-type Spray Gun. "Dress up" your jigs and fixtures and protect them against rust. Becker Spray Gun eliminates cumbersome hoses, electric cords, compressors—permits taking the spray to the work. Powerful CO₂ cartridge sprays up to one 21 oz. containerful. Sprays paints, rust-proofing, waxes, oils, dressings, fire-proofing, water-proofing, etc.

SEE YOUR DISTRIBUTOR! If he cannot supply you, send \$15.95; we ship postpaid. Extra CO₂ cartridges, 10 for \$1 postpaid.

SULLIVAN-BECKER CO., Dept. 453D, KENOSHA, WIS.



PORTER McLEOD

**16" Geared Head Quick Change
Screw Cutting Engine Lathes
6'—8'—10' Lengths**

**ONE OF THE FINEST ENGINE LATHES
MADE IN THE UNITED STATES TODAY**

Prompt Delivery

Rigid and vibration-free, the Porter McLeod lathe is the product of a 60 year old company. More than 2500 are in service! All headstock gears are made of specially hardened chrome nickel steel. The spindle, also of chrome nickel steel, is forged and bored from solid stock, mounted front and rear on Timken roller bearings.

Many desirable features are incorporated in this precision lathe which is distributed exclusively by MOREY . . . Includes tailstock of cutaway pattern, taper gibbed compound rest. Lead screw has a chasing dial allowing operator to catch any thread at the beginning of each successive cut, while the feed rod is equipped with an adjustable automatic stop.

Write us for detailed catalog! Sales territories open.

PARTIAL SPECIFICATIONS

Distance between centers (6'): 36"; (8'): 60"; (10'): 84". Hole through spindle: 1 1/4". 12 spindle speeds, 23.6 to 1000 RPM. Anti-friction bearing headstock. 5 HP motor.

MOREY
...for more value!

MOREY MACHINERY CO., INC.
Manufacturers • Merchants • Distributors
410 BROOME ST. • NEW YORK 15, N. Y.
TELEPHONE: GOMM 9-3000 • CABLE: YOUNGMECH

Metal-Working News in Brief

Cleco Division of Reed Roller Bit Co., Houston, Texas, has announced the appointment of **General Equipment & Machine Co.**, 511 E. Colfax Ave., South Bend 17, Ind.; **A & I Supply Co.**, 614-616 Virginia St., W., Charleston, W. Va.; **Lyons Machinery Co.**, 904 Broadway, Little Rock, Ark.; and **Equitable Equipment Co., Inc.**, 410

Camp St., New Orleans 12, La., as distributors for Cleco products in their respective areas.

— o —

The appointment of **Bennett Burgoon, Jr.**, as sales manager of the Metal-Working Division has been announced by Kennametal, Inc., Latrobe, Pa. Mr. Burgoon joined the company in 1941 as a sales representative in northwestern Illinois and Iowa. The company has also announced the appointment of **Norman W. Oberg** as a die sales engineer. Mr. Oberg will operate from the firm's main plant in Latrobe.

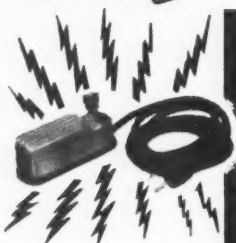
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S. W. Card Mfg. Co., Mansfield, Mass., has announced the appointment of **Arthur E. Jamieson** as sales manager. Mr. Jamieson was formerly in charge of Ohio-Pennsylvania sales. The company has also announced the appointment of **Russell L. Dickson** as factory representative in the Ohio-Pennsylvania territory. Mr. Dickson will have his headquarters in Cleveland.

LUFKIN MITI-MITE Magnetic Tools



★ **ATTACH INSTANTLY**
TO EITHER CURVED OR FLAT SURFACES



PORTABLE DEMAGNETIZER

Completely de-magnetizes by merely sliding over surface of the item. Lightweight — easily portable — small size for easy use in hard-to-reach places.

10 TOOLS ★ HUNDREDS OF SHOP USES

Handy-Lites give you light where you need it — light those hard-to-see places. 4x magnifier. Heavy duty indicator with or without surface gage shoe. Indicator holders take nearly any indicator without haphazard clamping.

BUY LUFKIN TAPES
RULES • PRECISION TOOLS
FROM YOUR DISTRIBUTOR



LUFKIN RULE CO., Saginaw, Mich. Dept. MM

RUSH ME YOUR FREE BOOKLET DESCRIBING
LUFKIN MITI-MITE MAGNETIC PRODUCTS.

AD No. 250

Name

Street

City State

CAMS

MADE TO YOUR SPECIFICATIONS

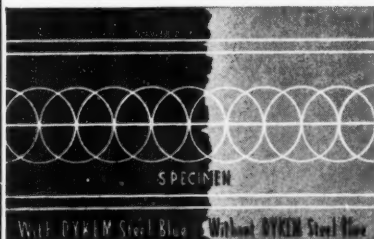
LET US HANDLE
YOUR CAM PROBLEMS

BLOOMFIELD TOOL CORPORATION
37 Farrand St. Bloomfield, N. J.

...for more than
1001 jobs



HJORTH LATHE & TOOL CO.
8 BEACON STREET WOBURN, MASS.



DYKEM STEEL BLUE

Stops Losses in Making Dies and Templates

Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

Write for full information.

THE DYKEM COMPANY

2301F NORTH 11TH ST. ST. LOUIS, MO.

HANCHETT



*knife
grinder*

NEW! fully automatic — low priced
KNIFE CAPACITY — 32" to 108"

MODEL DN FEATURES:

1. Timing belt drive. Positive — quiet — non-slipping.
2. Eliminates all gears (Requires no lubrication).
3. Free from vibration and reversal shock.
4. 100% Anti-Friction Bearings.
5. Precision ground ways for accuracy.
6. Guarantees perfect machine alignment.
7. Force feed lubricated ways.



Other models

AK EXTRA HEAVY DUTY
GK HEAVY DUTY

FINEST KNIFE EDGES

Write for complete information

HANCHETT MANUFACTURING COMPANY

World's Largest Manufacturer of Knife Grinding and Saw Sharpening Machinery

MAIN OFFICE — Big Rapids, Michigan

WEST COAST — Portland, Oregon



Metal-Working News in Brief

George W. Urban has been appointed purchasing agent of The Cleveland Crane & Engineering Co., Wickliffe, Ohio, to succeed **Henry Karr** who has retired after over 50 years of service with the company. Mr. Urban was assistant purchasing agent for the past seven years and was formerly associated with Pesco Products Company as a buyer.

Paul D. Cornelius, former chief engineer for the J. O. Mfg. Co., South Gate, Calif., has been appointed to head the design and research department of Vlier Engineering, Inc., Los Angeles. Mr. Cornelius' wide background in tool and machine research will be used to continue the development of Vlier machine tool specialties which include spring plungers, fixture keys, spring stops, toggle pads, and torque thumbscrews.

— o —

Adamas Carbide Corp., Harrison, N. J., has announced the appointment of **Clyde Smith**, 371 N. Olive St., Elyria, Ohio, as its sales representative in southern Ohio. Mr. Smith was formerly associated with Firth-Sterling.

— o —

Clearing Machine Corp., Chicago, Ill., has announced the appointment of **Gordon M. Sommers** as chief engineer of its Hamilton, Ohio, plant. In his new post, Mr. Sommers will be responsible for the design of all presses and auxiliary equipment manufactured at Hamilton.



KNU-VISE pliers help speed aircraft production

Twenty-two Knu-Vise toggle-action pliers accompany this huge aircraft assembly jig when delivered to a prominent airplane manufacturer. The pliers play an important part in attaching longerons and aluminum angles to section of fuselage.

This job shows one of the countless ways in which Knu-Vise pliers and clamps are used to facilitate production.

Three Knu-Vise models selected for their high efficiency in specific operations: P-400, P-1200, P-1800.

Photo, courtesy of Banner Die & Fixture Co., Detroit.

**KNU-VISE
PRODUCTS**

LAPEER MFG. CO.

3048 DAVISON ROAD • LAPEER, MICHIGAN

Western Division: 422 Magnolia St., Glendale, Calif.

for rotary
files
it's



haskins

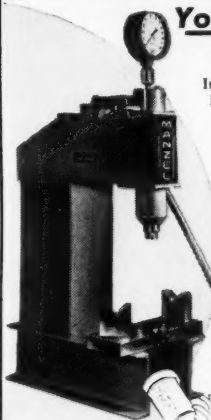
Make Haskins your reliable source for finest hand-cut ground or carbide cutters. Faster cutting, longer tool life, fewer sharpenings. Cut labor and over all tool costs. All shapes, types and sizes. For catalog, write



R. G. HASKINS COMPANY
2647 W. Harrison St. • Chicago 12, Ill.

The ARBOR PRESS

**You've Been
Looking For!**



It's the new Manzel 10 Ton Hydraulic Arbor Press...engineered to meet a variety of needs in manufacturing plants and automotive service stations. The long ram stroke and unusual depth and width of throat make it adaptable to straightening, material testing, bending, bearing or bushing work, and many other uses. Gauge is optional.

The press is portable...or can be permanently mounted on bench, column, or wall. Power unit operates 3 times faster. Ram is self-retracting.

Write today for complete information.

Manzel

315 Babcock Street
Buffalo 10, N. Y.

Jobber
inquiries welcome



BRADFORD METALMASTER LATHES

**Geared Head Engine
and Tool Room Lathes**

14 1/2" - 16 1/2" - 18 1/2" actual
swing

The Bradford *Metalmaster* Lathe is known throughout industry for its high efficiency, speed, dependable accuracy and durability under heavy service. A sound design, precision workmanship and the use of the finest materials and components have made the *Metalmaster* the top performing lathe of its class.

BRADFORD

"METALMASTER" GRINDERS

Are better built; will give years of outstanding performance on the most rugged kinds of external grinding and tool sharpening work.



Heavy Duty Model 200

Motor totally enclosed. All ball bearing construction. Meets American Safety Code standards. Exhaust connections, spark breakers, eye shields, positive shaft lock. 220-440 - 550 volts, 50 or 60 cycles, 2 or 3 phase motors with 2 to 7 1/2 h.p. capacities.

Get the tools that do the job—faster—better—at less cost. Specify Bradford Tools. See your Bradford dealer or write for complete information.

The BRADFORD MACHINE TOOL Co.

658 Evans St.

Cincinnati, Ohio

Precision since 1840

Metal-Working News in Brief

Brown & Sharpe Mfg. Co., Providence 1, R. I., has announced the appointment of **Fred L. Pritchard**, formerly of the firm's Detroit office, as representative of the Cincinnati office and will assume full responsibility for the operation of this office. Mr. Pritchard succeeds **Howard K. Jackson** who has retired after 34 years of service with the company.

Norton Co., Worcester 6, Mass., has announced that **Warren R. Spofford**, abrasive engineer formerly handling Worcester County, will take over a new metropolitan Boston territory, succeeding **Raymond J. Forkey** who resigned to become sales engineer for Coppus Engineering Corporation. **Sidney B. Wetherhead**, abrasive engineer who assisted Mr. Forkey, will now assume complete responsibility for the eastern Massachusetts area, excluding

the new Boston territory. **Gordon T. Rideout**, formerly sales engineer, Sales Engineering Department in the Worcester office, has been appointed abrasive engineer and will succeed Mr. Spofford. **Evan C. Luce**, formerly grinding engineer, Sales Engineering Department, has been appointed sales engineer and will take over the responsibilities vacated by Mr. Rideout. **David H. Paul**, formerly abrasive engineer in Arkansas, western Tennessee, Mississippi, and Louisiana, has been appointed field engineer in the Philadelphia district.

The Hyprez formula
for the
right finish
faster

HYPREZ

**High Precision
DIAMOND
COMPOUNDS**

The exclusive vehicle engineered for highest performance, together with scientifically graded pure diamond particles, produces superior finishes faster . . . A complete range of grades from finest to coarsest is available.

Ask For a Free Demonstration,
or Technical Bulletin No. S-453

HYPREZ DIVISION

ENGIS EQUIPMENT COMPANY, 431 SOUTH DEARBORN ST CHICAGO 5, ILL.



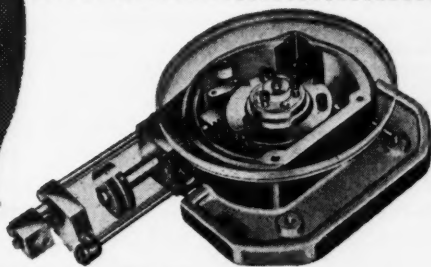
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LOWER COSTS

GREATER DEPENDABILITY



ALLEN AIR OPERATED DIAL FEED TABLES

MODEL 11EA and 11EB

- Working Mechanism Completely Enclosed
- Rack and Gear Drive

Please Write for Illustrated Brochure.

- Clockwise or Counterclockwise Rotation
- Adjustable from 4 to 24 Index
- Guaranteed Against "Over-ride"

- All Working Parts Flame Hardened

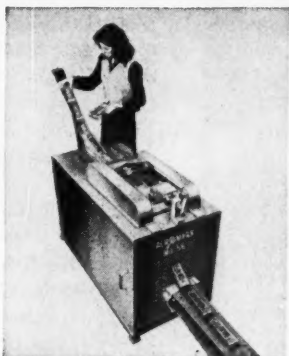
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Cable Address: STRADESO, N. Y.

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PRINCIPAL CITIES

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COATING, FILLING, AND PRINTING, MACHINES.

WRITE FOR LATEST LITERATURE. Send Samples of
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OTHER PRODUCTS—

MAKERS OF—

Marking and Numbering Machines,
Stamps, Dies, Type, Name - Plates,
Metal Signs, Engraving, Burning
Brands, Marking Inks, and Special
Machines for all Kinds of Marking.

The
ACROMARK
Company

9 MORRELL ST., ELIZABETH 4, N. J.
"THE ORIGINAL MARKING SPECIALISTS"

Metal-Working News in Brief

Herbert P. Dales has been appointed sales manager and **Carl L. Adelman** assistant sales manager of the Coated Products Division of The Carborundum Company. Headquarters of the two men will be at the Coated Products Division in Wheatfield, N. Y. The company has also announced personnel changes in three district sales offi-

ces. **Russell P. Colosi**, formerly office manager for the Cleveland office, has been appointed assistant to the Cleveland district sales manager; **Charles J. Walter** has been transferred from the position of office manager of the Los Angeles district to office manager of the Cleveland district; **Wilfred Robson**, assistant office manager of the Chicago district, has been transferred to the position of office manager of the

Los Angeles district sales office; and **Joseph A. Marrone**, chief stock clerk at the Chicago office, has been appointed assistant office manager of the Chicago district sales office.

— o —

The appointment of **Paul L. Thornburg** as factory representative in Virginia, North Carolina, South Carolina, and Tennessee for Utica tools has been announced by Utica Drop Forge & Tool Corporation. Mr. Thornburg will serve the mid-south area as a direct representative of Utica tools, handling only this line of pliers, adjustable wrenches, and screw drivers.

**For easier grinding
and mirror finishes in a
fraction of the time**



STAR DUST DIAMOND
WHEELS AND HONES

Absolute uniformity resulting from laboratory grading is the reason for the success of STAR DUST Diamond Powders and Compounds . . . And the new line of STAR DUST Diamond Wheels and Hones finds immediate acceptance because for the first time this superior diamond quality is combined with a new bonding formula. That means unequalled performance and wheel life.

Be "Laps Ahead" with STAR DUST! Most sizes available for fast delivery. Write for complete information and new comprehensive catalog B-9

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THE EXPANDED**

Star Dust
LINE!

**NOW . . . A COMPLETE RANGE
OF STAR DUST DIAMOND ABRASIVES
FOR EVERY PURPOSE**

STAR DUST Laboratory graded
Pure Diamond Powders



STAR DUST
Laboratory graded dia-
mond lapping
compounds in
18 gram appli-
cator gun . . .
or 5 gram oph-
thalmic tipped
tube.



ACE ABRASIVE LABORATORIES

250 WEST 57TH STREET • NEW YORK 19, N. Y.

"THE ORIGINAL"
MAUSER PRECISION
VERNIER CALIPER
\$14.75 FPD



NEW EXCLUSIVE CAMLOCK AND
GIB IMPROVEMENT INSTANTLY
FIXES SETTING, PREVENTS
SHIFTING, GUARANTEES
SQUARENESS OF JAWS.
THE MAUSER TRADEMARK..
IS YOUR PROTECTION.

WONEY BACK GUARANTEE
FOR MEASURING INSIDE,
OUTSIDE, AND DEPTH.
3 GRADUATIONS
1/1000" - 1/128"
1/10mm. IN BACK

GEO. SCHERR CO. INC. **198A Lafayette St., N. Y.**

C A M S

We are fully equipped to **GRIND OR MILL**
 a complete range of CAMS to your speci-
 fications on our **ROWBOTTOM** Cam Milling
 Machines.

Your inquiries answered promptly.

HIMOFF MACHINE CO., INC.
23-16 44th Road Long Island City 1, N. Y.

A proven necessity...

RAHN Black Granite
 (DIABASE)



Surface Plates
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Warp-free
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 Extra Hard
 Super-smooth

ACCURACY
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Write for literature, **FREE TRIAL**

RAHN GRANITE SURFACE PLATE CO.
636 N. Western Av. Dayton 7, Ohio


SAWMASTER HACK SAW



6" x 7" capacity saw
 illustrated. 4" ca-
 pacity at 45° angle.

In every plant there is a large variety
 of uses for the SAWMASTER Hack Saw.
 Its self-contained portability, its low
 cost, and rugged construction to handle
 work in capacities of 6" x 6", 4" x 4",
 and 6" x 7" with 5 models make it an
 economical, accurate, efficient and ver-
 satile machine. Many superb features.
 All SAWMASTERS operate with efficient
 push-cut action.

Write for
Bulletin 300.



MILLER-KNUTH MFG. CO. OMAHA, NEB.

Metal-Working News in Brief

Firth Sterling, Inc., has announced the appointment of **John P. Sweeney** as Detroit district manager, succeeding **Gunther A. Jacobs**; **Munro J. Mann** as assistant district manager of the Detroit branch; **Fred Lord** as chief engineer of the Mining Sales Division; **E. G. Moffat** as manager, Carbide Sales Division, succeeding **C. R. Har-**

mon who resigned; **Kenneth F. Julin** as assistant manager, Carbide Sales Division; and **J. Martin Stokes** as assistant general sales manager of administration.

— o —

Lawrence H. Lemke has been appointed general superintendent of D. J. Murray Mfg. Co., Wausau, Wis. Mr. Lemke was formerly superintendent of the company's machine shop.

— o —

F. Steele Blackall, III, former assistant superintendent of the Contract Division, has been appointed assistant general manager of The Taft-Peirce Mfg. Co., Woonsocket, R. I. Mr. Blackall is also assistant treasurer and a director.

— o —

The Pipe Machinery Co., Cleveland, Ohio, has announced the appointment of **Russel L. Gergen** as sales manager of the Gage Division. Mr. Gergen has been with the company 12 years and served as chief engineer, assistant chief inspector, assistant superintendent, and sales engineer.

SAVE 3 WAYS WITH A



LUCIFER

CHECK THESE PRICES

Furnace Size	2000'	2300'
6x 6x12"	\$467.00	\$548.00
9x 9x18"	647.50	764.00
12x12x24"	912.00	1068.90
18x18x36"	1419.75	1629.50

Complete with 100% automatic electronic controls.

ELECTRIC FURNACE

1 SAVE with a Lucifer Electric Furnace on **FIRST COST**. Our straight line production permits economical selling price, despite use of highest quality materials throughout. Check costs on other furnaces...feature by feature...you'll save money on the Lucifer Electric Furnace **EVERY TIME**.

2 SAVE ON MAN HOURS with a Lucifer Electric Furnace. Less operator attention needed — Lucifer controls are **EXACT**. They reach **SPECIFIED** heat rapidly and retain **SPECIFIED** temperature without variation. No special experience required when you use a Lucifer Furnace.

3 SAVE on maintenance expense with a Lucifer Electric Furnace. Finest refractory materials are built into Lucifer Furnaces for better, more efficient heat retention. Elements are guaranteed, long lived, trouble free. You save 3 ways with a Lucifer Electric Furnace. More than two thousand satisfied users.

WRITE FOR FREE literature, specifications and price list of Lucifer Furnaces in wide range of sizes—top loading and side loading types. Engineering advice without obligation. Write, wire or 'phone today.

GILBERT S. SIMONSKI COMPANY

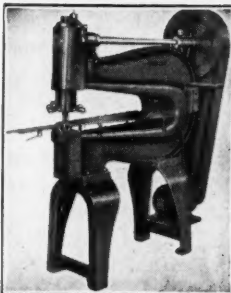
Route No. 611

Neshaminy 10, Pa.

Phone Hatboro 0411

Sole Manufacturers of Lucifer Electric Furnaces

SAVAGE NIBBLING MACHINES



CAPACITIES
UP TO
3/4"

—
ASK FOR
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"11"
—

"NIBBLE YOUR COSTS"

FOR TUBE SLOTTING, TUBE SHAPING
AND CUTTING FLAT SHEETS BY
TEMPLATE OR TO A SCRIBED LINE.

W. J. SAVAGE COMPANY

Knoxville

Since 1885

Tennessee

PIONEER MFRS. OF NIBBLING MACHINES

MARK and DEMAGNETIZE IN ONE OPERATION

THE
Luma
WAY



The Luma combination etchtool and demagnetizer, etches, demagnetizes, anneals and solders. Permanently marks hardest steel with ease of a pencil. Write for complete information.

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WICACO CONTINUOUS OIL GROOVER cuts grooves of all descriptions, internal or external, continuous or intermittent.

Send us samples for grooving. We will return them cut to specifications, with a record of time and cost estimate. No obligation.

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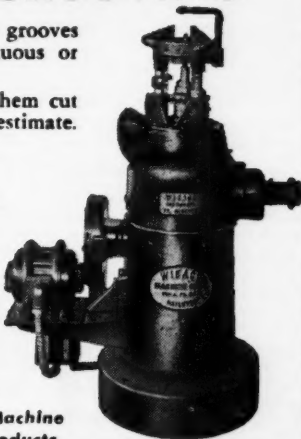
WAYNE JUNCTION, PHILA. 44, PA.

Manufacturers of

Precision Machinery and Machine Parts

Roller Bearing Twister Spindles—Spindle Oiling Machine

Precision Internal Grinder—Screw Machine Products.



Metal-Working News in Brief

Rockwell Mfg. Co., Pittsburgh 8, Pa., has announced that the responsibilities of **L. A. Dixon**, executive vice president, have been expanded to include jurisdiction over the company's Power Tool Operation. Rockwell's Power Tool Operation includes the Delta Power Tool Division, Rockwell Tools, Inc., and the Deluxe Saw & Tool Company.

Cyril Stead Taylor, nationally prominent physical chemist and for 23 years chief of the Physical Chemistry Division, Aluminum Research Laboratories, New Kensington, Pa., has retired. **Dr. Allen S. Russell** has been appointed to replace Mr. Taylor as division chief.

— o —

Crucible Steel Company of America, Pittsburgh, Pa., has announced the appointment of **Edward N. Ryan** as assistant manager

of its New York branch sales office. Mr. Ryan, who joined the company in 1935, was formerly a sales engineer at the New York branch.

— o —

The Cleco Division of Reed Roller Bit Co., Houston, Texas, has announced the appointment of **Maintenance Service Co.**, 112 Academy St., South Orange, N. J.; **Detroit Supply Co., Inc.**, 113 S. Brandywine Ave., Schenectady, N. Y.; and **Sears & Bowers**, 411 Spring Garden St., Easton, Pa., as distributors for Cleco products in their respective areas.



**"We Consider
DY-NAMIC BALANCING
absolutely necessary for
HIGH SPEED Rotating Parts"**

says G. Selig, vice-president and plant manager of Rensel Industries, Chicago, Illinois, where this "Bear" Dy-Namic Balancing Machine is used to balance impellers.

The need for Dy-Namically Balancing every rotating part—especially those that spin at high speeds—is being recognized in every phase of industry. Select the "Bear" Machine that fits your budget and your operation from the...

free DY-NAMIC BALANCING MANUAL!

Tells how you can easily, quickly, economically balance rotors, armatures, crankshafts, and any other part that turns, weighing from 4 oz. to 8 tons! See how to reduce wear, eliminate noise and vibration, improve all-around performance of finished product. Your copy sent without cost or obligation. Bear Mfg. Co., Dept M-25, Rock Island, Ill.

6038

"BEAR"
STATIC AND DY-NAMIC BALANCING MACHINES
balance rotating parts weighing from 4 oz. to 8 tons



No. 4B PUNCH

Capacity— $1/16$ " hole thru $1/16$ gage iron.
Length— $8\frac{1}{2}$ "; Depth of throat—2".
Weight—3 lbs.
Stock size punches— $1/16$ " to $9/32$ " by $1/64$ ".
Can be had complete in metal box as shown
or in cardboard carton.

W. A. WHITNEY MFG. CO.

640 Race St.

Rockford, Ill.

BLANKING, NOTCHING, PARTING, EMBOSsing?

- FAST DIE CHANGES, with standard Punches and Dies.
- 15 Ton capacity.
- 6' throat depth permits reaching to center of 12' piece.
- Large Punch Plate and Bed permits blanking over big areas.
- Patented Leaf Assembly provides positive punch and die alignment. Diagram illustrates versatility of Press—each blanking done with 1 stroke.



Leslie
Model A
Hand
Punch
Press

\$120.00
F.O.B.
Chicago

Tool your jobs quickly, economically with our wide variety of standard punches and dies.

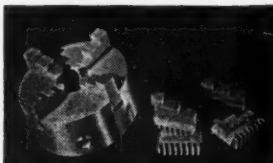
Write now for illustrated catalog and circular showing punches and dies available from stock.



LESLIE WELDING CO., 2940 Carroll Ave., Chicago 12

**IMMEDIATE DELIVERY
FROM STOCK**

BURNERD CHUCKS PRECISION BUILT MADE IN ENGLAND



SELF CENTERING GEARED SCROLL

Nickel Chrome Steel Pinions & Scroll, Semi-Steel Body, Universal Three Jaw, Two Sets of Jaws, Three Pinion

Model	Size	Wt. lbs.	Price
28	$2\frac{3}{4}$ "	$2\frac{1}{2}$	\$ 25.00
29	$3\frac{3}{4}$ "	$3\frac{1}{2}$	26.50
30	4"	$6\frac{1}{2}$	30.00
30A	5"	$11\frac{3}{4}$	37.50
31	6"	$17\frac{1}{4}$	45.00
30BP*	4"	$8\frac{1}{4}$	33.50
30ABP*	5"	15	42.50
31BP*	6"	21	50.00
52	$7\frac{1}{2}$ "	25	57.50
53	9"	43	67.50
54	$10\frac{1}{2}$ "	62	95.00
55	12"	88	125.00

Universal Four Jaw, Two Sets of Jaws, Two Pinion

Model	Size	Wt. lbs.	Price
29Y	$3\frac{1}{4}$ "	$3\frac{3}{4}$	\$ 30.00
30Y	4"	7	37.50
30AY	5"	$12\frac{1}{2}$	43.50
31Y	6"	$18\frac{1}{4}$	52.50
52Y	$7\frac{1}{2}$ "	29	85.00
53Y	9"	42	95.00
54Y	$10\frac{1}{2}$ "	62	110.00
55Y	12"	88	150.00
30AYBP*	5"	$15\frac{3}{4}$	48.50
31YBP*	6"	22	57.50

Soft Jaws Available

LIGHT INDEPENDENT CHUCKS

Nickel Steel Operating Screws, Semi-Steel Body, Four Jaw Reversible, Hard Steel Jaws

Model	Size	Wt. lbs.	Price
35A	$3\frac{1}{4}$ "	$2\frac{3}{4}$	\$ 12.50
35B	4"	4	14.00
35C	$4\frac{1}{2}$ "	5	18.50
34	6"	10	22.50
35BP*	4"	$6\frac{1}{2}$	18.00
35CBP*	$4\frac{1}{2}$ "	7	22.50
34BP*	6"	14	26.50

Models marked with asterisk () are fitted with $1\frac{1}{2}$ "—8 Back Plate for all popular 9" and 10" lathes.

DE WITT EQUIPMENT CO. 136 Lafayette St., New York 13, N.Y.

Telephone: WA 5-4048

Metal-Working News in Brief

Colonel William J. Darmody (U. S. Army, Ret.), a widely known ordnance gage expert, has joined The Sheffield Corp., Dayton, Ohio, as part-time consultant. Colonel Darmody will make his home and headquarters in Washington, D. C., but will spend part of his time each month at the company's main plant in Dayton.

Clearing Machine Corp., Chicago, Ill., has announced the appointment of Satterlee Co., Minneapolis, Minn., as a distributor. Satterlee Company will handle the entire Clearing press line in Minnesota and the northern counties of Wisconsin.

— o —

E. W. Ristau has been appointed vice president in charge of sales for the Power Tool Division of Rockwell Mfg. Co., Pittsburgh, Pa. Mr. Ristau was formerly director of sales and advertising for the Delta Power Tool Division. The Power Tool Division includes the Delta Power Tool line, Deluxe Saw & Tool Company, and Rockwell Tools, Incorporated.

— o —

Thor Tools of Mexico, Inc., Basilio Badillo No. 47, Mexico, D. F., Mexico, has been added to its chain of export offices by Thor Power Tool Co., Aurora, Ill. The Mexican office will be under the direction of C. L. Rowett, who is the Thor representative in Mexico.



No. 44 FORGED STEEL SUPERCLAMP *Individually Power-Tested for Better Performance*



Strongest Forged Steel Clamp for its weight and at the lowest price.

Frames are forged by our patented process from extremely stiff steel and are heat treated. The screws are hardened steel to prevent bending and battered threads and are of large diameter. Each Superclamp is tested on our Power Testing Machine before it goes into stock.

WRITE FOR CATALOG: Showing Clamps for all purposes, also Chisels, Punches, Star Drills, Brace Wrenches, Washer Cutters, File Cleaners, etc.

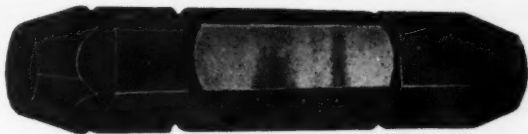
THE CINCINNATI TOOL COMPANY
1947 Waverly Ave., Cincinnati 12, Ohio

There is an Industrial Distributor stock near you



COLLET TYPE PIN GAGE HANDLE

Bushings for cylindrical and thread plug gages.



RED

GREEN

Complete line of gage supplies, handles, blanks, ring gage parts, etc. from stock.

HURON MACHINE PRODUCTS

6252 Monroe Blvd., P.O. Box 146
DEARBORN • MICHIGAN



TAMMS

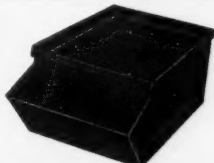
STOP Oily Floor Mishaps with FULLER'S EARTH

Avoid costly accidents caused by slipping on oily or greasy floors! Reduce fire hazards! Replace sawdust or wood shavings with Fuller's Earth. Every shop needs this low-priced safety aid. Fuller's Earth absorbs oil and grease—and it's non-inflammable. Write for FREE SAMPLE to test.

Dept. RM-9, TAMMS INDUSTRIES, Inc., 228 N. LaSalle Street, Chicago 1



Stack Up



Sterling Bin Front "Top Rim"
Steel Stacking Box.
Size: 18" x 12" x 6".

THESE BOXES AGAINST ANY!

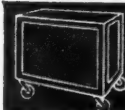
Once you use and compare Sterling stacking boxes, you'll know why we invite comparison in design, construction, and price. Our "Top Rim" construction provides stronger support all around the box... no corner inserts to become loose and fall out. Efficiency in designing and manufacturing allows us to quote favorably on any type or size stacking box.

Write for literature and prices.

Sterling Factory Equipment Co., 183 Charles St., Providence, R. I.



Sterling "Top Rim" Steel Stacking Box with drop handles.
Size: 18" x 12" x 6".



Sterling

Quality Handling & Storage Equipment



Metal-Working News in Brief

Goddard & Goddard Co., Detroit, Mich., has announced the recent death of its founder and chairman of the board, **Archibald N. Goddard**.

— o —

Wilson Mechanical Instrument Division, American Chain & Cable Co., Inc., Bridgeport, Conn, has announced the opening of a new service shop at 20455 Sherwood, Detroit 34, Mich.,

with facilities and factory-trained personnel for servicing and repairing "Rockwell" and "Tukon" hardness testers. A complete stock of tester parts, as well as "Brake" diamond penetrators, test blocks, and accessories, will be maintained.

— o —

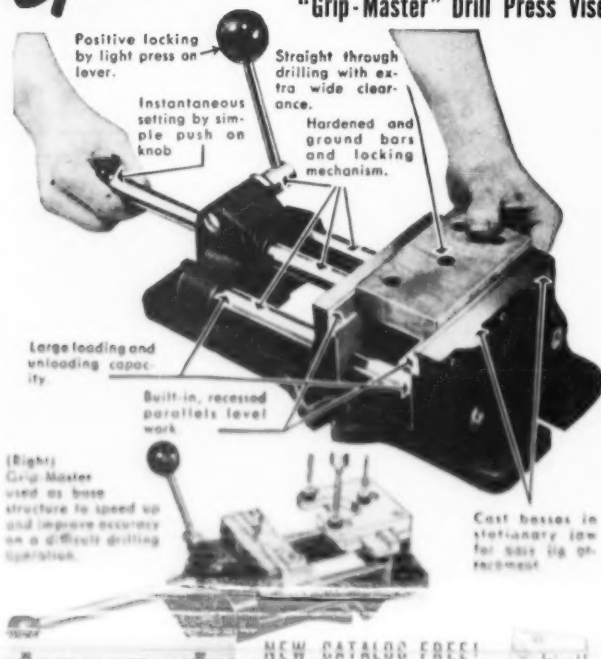
The Timken Roller Bearing Company has announced the appointment of **Richard K. McConkey** to the post

of assistant general manager of the Industrial Division, succeeding the late **Melvin H. Kuhl**. Mr. McConkey, who has assumed his new duties at the main office in Canton, Ohio, was formerly district manager of the Industrial Division at the company's Moline, Illinois, office.

— o —

Theodore Bausch Drescher, vice president, Bausch & Lomb Optical Co., Rochester, N. Y., died recently in his home at the age of 85 years. Mr. Drescher joined the com-

Speed-up OPERATIONS with heinrich "Grip-Master" Drill Press Vise



NEW CATALOG FREE!

STANDARD STEEL SPECIALTIES

MACHINE KEYS

We can supply a complete line of finished machine keys including gib head and taper keys, rod keys, round end keys, etc.

WOODRUFF KEYS

Complete stock of standard keys on hand for prompt shipment. Made from open hearth or alloy steel.

TAPER PINS

Available in sizes 7/0 through 10 and lengths from 3/4 inch to 6 inches. Others made to specification.

MACHINE RACK

Can furnish rack from almost any size blank and pitch as well as length to form continuous sections.

Write for catalog

STANDARD STEEL SPECIALTY COMPANY

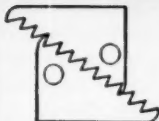
BEAVER FALLS

PLANTS—BEAVER FALLS, PA.

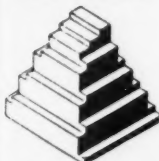
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• HAMMOND, IND.

REID Set-up Aids



Magnetic Blocks and Parallels



T-Slot Bolts

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Steel—Maple



Pyramid Set-Up Blocks



Also Hand Wheels, Machine Handles, Levers, Cranks, Plastic Balls, Cast Iron Knobs, Machine Vises.

Write for Catalog and Prices on Complete Reid Line

REID TOOL SUPPLY CO.

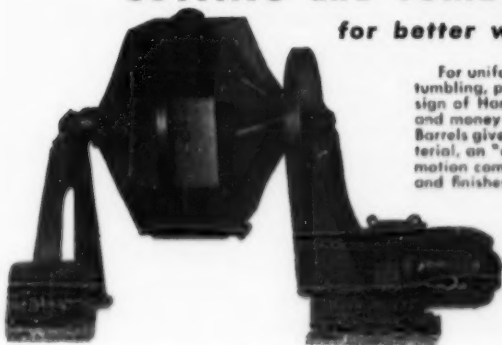
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MUSKEGON HTS., MICH.

HARTFORD TRIPLE ACTION

CUTTING and TUMBLING BARRELS

for better work in less time!



For uniform cutting down, wet or dry grinding, tumbling, pulverizing and mixing, the unique design of Hartford Triple Action Barrels saves time and money and produces better results. Hartford Barrels give a TRIPLE ACTION in tumbling the material, an "over and over, end to end, folding-in" motion combined, which quickly grinds off burrs, and finishes and smooths the general surface of any article in the load. These barrels are available in two sizes, large and small, and with both motor and belt drive. Hartford also makes steel burnishing balls scientifically correct in design and material for each specific job. Bulletin on request.

THE HARTFORD STEEL BALL CO.

Metal-Working News in Brief

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— O —

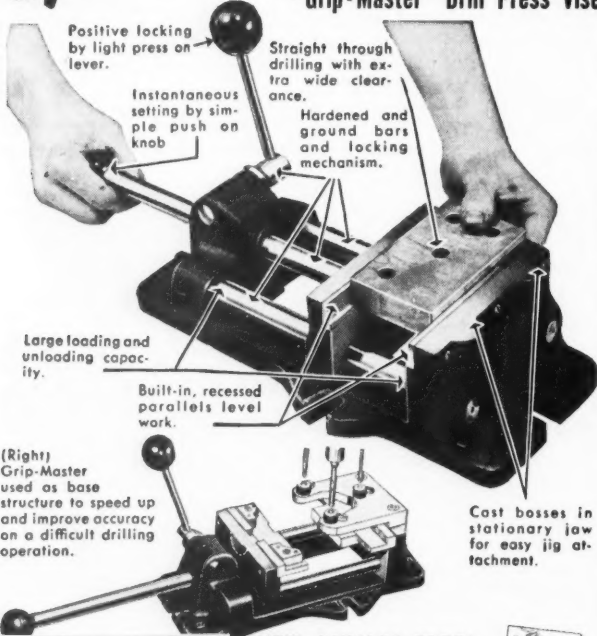
Theodore Bausch Drescher, vice president, Bausch & Lomb Optical Co., Rochester, N. Y., died recently in his home at the age of 58 years. Mr. Drescher joined the company in 1914 as a machinist and was elected a vice president in 1932.

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Positive locking by light press on lever.

Instantaneous setting by simple push on knob.

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Complete stock of standard keys on hand for prompt shipment. Made from open hearth or alloy steel.

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Available in sizes 7/0 through 10 and lengths from 3/4 inch to 6 inches. Others made to specification.

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Can furnish rack from almost any size blank and pitch as well as length to form continuous sections.

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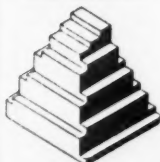
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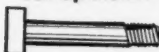


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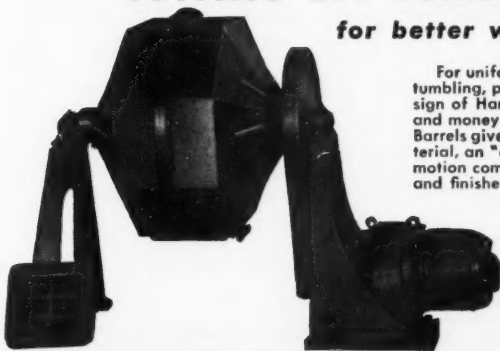
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For uniform cutting down, wet or dry grinding, tumbling, pulverizing and mixing, the unique design of Hartford Triple Action Barrels saves time and money and produces better results. Hartford Barrels give a TRIPLE ACTION in tumbling the material, an "over and over, end to end, folding-in" motion combined, which quickly grinds off burrs, and finishes and smooths the general surface of any article in the load. These barrels are available in two sizes, large and small, and with both motor and belt drive. Hartford also makes steel burnishing balls scientifically correct in design and material for each specific job. Bulletin on request.

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2H552

Metal-Working News in Brief

Detroit Stamping Co., Detroit, Mich., has announced the election of **William H. Roberts** as vice president and secretary, succeeding **John Beck** and **H. G. Roberts** who have been serving, respectively, in these offices. Mr.

Roberts, a member of the board of directors of Detroit Stamping, has been associated with the company for 15 years.

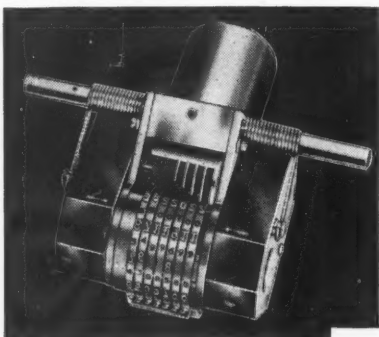
— o —

M. S. Phoenix has been named chief engineer for **F. E. Anderson Oil**

Company. Mr. Phoenix, who has a wide experience in the tool design and maintenance fields, will have charge of all service operations.

— o —

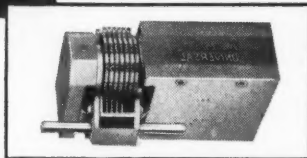
Roy O. Johnson, metallurgist, and **Charles W. Eastman**, industrial engineer, have joined the staff of **The Hydraulic Press Mfg. Co.**, Mount Gilead, Ohio. Mr. Johnson was formerly associated with **Fairbanks Morse & Company's** Beloit, Wisconsin plant as chief metallurgist. Mr. Eastman, in charge of methods, time study, tool design, and estimating at **H-P-M**, has had 20 years of industrial experience with a large number of Indiana companies.



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"Trade Mark" Numbering Head

these new Parker numbering heads for punch press stamping come in four to ten digit models and stamp consecutive or repeat numbers cleanly and sharply into the most rugged stock. A simple duplicating attachment can be added if required and a compound numbering head can be manufactured to your specifications to embody a trade mark, name or group of symbols to be stamped in one operation.

The larger heads have a direct reading feature which enables determination of machine setting at a glance from engraved numbers on the front of lettering wheels. Here is another instance of **Product Flexibility**. Let Parker's expert craftsmen and eighty years of experience solve your marking die and stamping problems too!

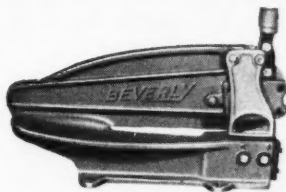
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Save Time . . . Labor . . . Materials with



Inside SLOTTER

Make cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H.C.H.C. blades.

BEVERLY metal cutting SHEARS

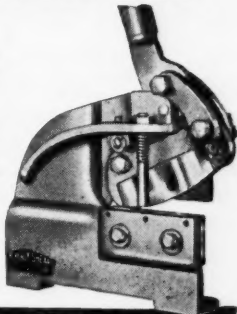
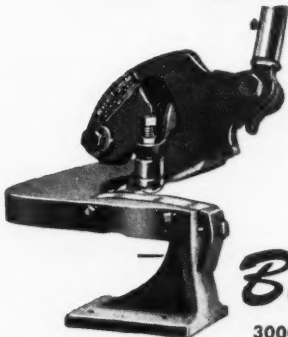
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Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—cap. to 3/16".

Slitting SHEAR

New "55" Series — easier cutting with compounded linkage. 3 models—cap. to 3/16"; trimming capacity to 5/16" mild.

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NEW LEITZ TOOLMAKER MICROSCOPE

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...CUTS INSPECTION TIME**

The **NEW LEITZ DESIGN** checks angular measurements in degrees and minutes.

Contains all Thread Templates for U.S. National thread profiles 6-80 pitch.

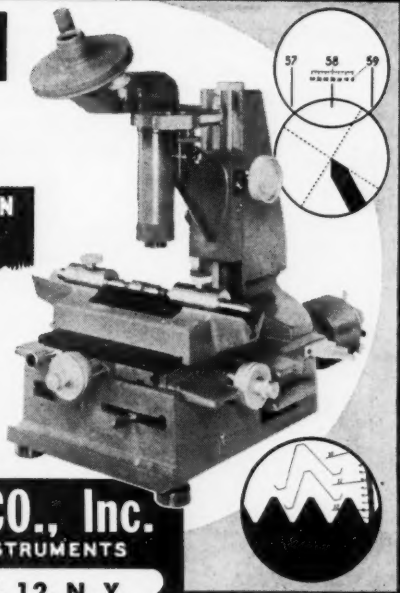
Contains Radii Templates from 21/64" to 13/16" by 1/64". Concentric circles from .010" to .280" by .010" and one blank compartment.

NOTE: TEMPLATES CAN BE OBSERVED IN 3 MAGNIFICATIONS: 10X - 20X - 30X

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Metal-Working News in Brief

A. C. Brown, Jr., regional manager of Air Reduction Sales Company, has been appointed general sales manager. Mr. Brown, who has been located in Pittsburgh, will have his headquarters at 60 E. 42nd St., New York City, New York.

— o —

Bausch & Lomb Optical Co., Rochester, N. Y., has announced the promotion of **Lee C. Becker** to manager of laboratory operations in the company's 155 branches throughout the U. S. Mr. Becker succeeds **Roy O. Pennock** who was recently promoted to vice president and general manager of Bausch & Lomb Optical Company Ltd. of Canada.

Horton Chuck Division of The E. Horton & Son Co., Windsor Locks, Conn., manufacturer of lathe chucks, has announced the appointment of **Price Davis** as manufacturer's representative for Horton in the state of Wisconsin. Mr. Davis has been associated with the machine tool industry since 1936 and operates his own business as a manufacturers' agent in Milwaukee, Wisconsin.

— o —

Gisholt Machine Co., Madison 10, Wis., has announced the election of **Werner I. Senger** to the newly created position of vice president in charge of balancing. Mr. Senger has been with Gisholt for over 35 years and has been in charge of balancing machine development and engineering since 1924.

Men who had to "lick" the very problems you're facing designed...

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That's why they're fast, accurate, so adaptable, so easy to operate. Why maintenance is simple. Why initial cost is low . . . Often considerable savings and improved punch press operations are possible if you let our engineering staff assist you. There is no obligation. Simply furnish the details relating to your need or problem and if possible send samples or drawings of the work. You will hear from us promptly.

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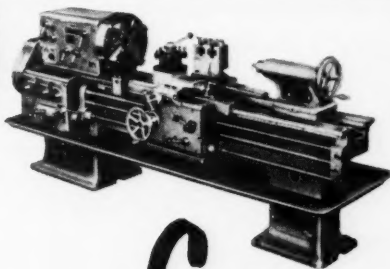
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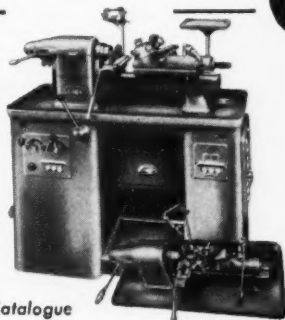
...has remained the guiding principle and obligation of our firm since the day of its founding.

Re-Orders surpass by far orders from new customers.



One of the LEINEN Lathes—all of which are designed to meet the most exacting requirements of THE MANUFACTURER OF PRECISION COMPONENTS... THE INSTRUMENT MAKER... and THE TOOLROOM.

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new shop equipment

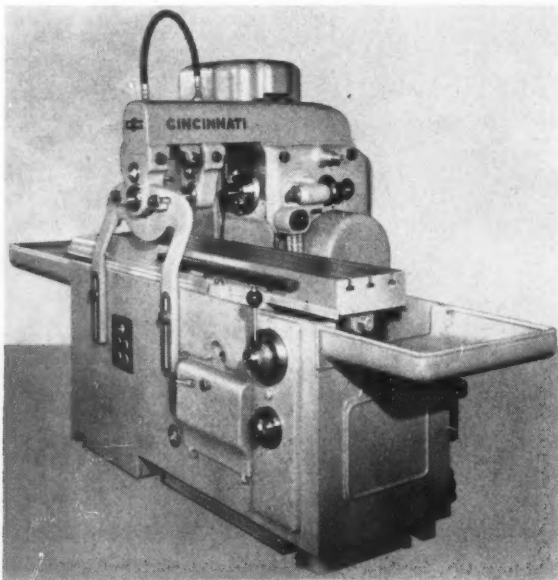
Automatic Milling Machine Is Available in Plain, Duplex, and Rise-and-Fall Styles

Designated as the No. 2-24, an automatic milling machine which is available in plain, duplex, and plain rise-and-fall styles and powered at the spindle by a 3 or 5-h.p. motor has been announced by The Cincinnati Milling Machine Co., Cin-

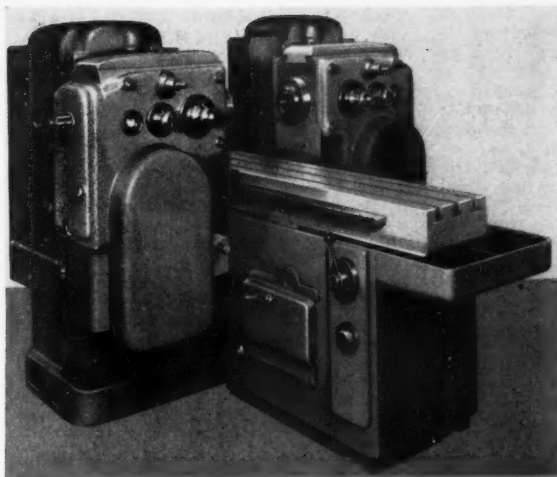
cinnati 9, Ohio. The standard table travel is 24 inches, although longer table travel, up to 144 inches, may be obtained for long, comparatively light work. Automaticity and manual maneuverability have been combined to an unusual degree. Through a cycle selector unit, a single lever initiates the complete milling operation, including automatic table cycle, automatic spindle stop, automatic backlash eliminator, automatic spindle carrier cycle of the rise-and-fall machine, and automatic spindle retraction which is available as extra equipment. To aid in setting up the machine, all automatic features can be nullified or bypassed for manual control.

An individual motor drives the spindle through V-belts and three gear contacts — 3 h.p. per spindle for standard spindle speeds and 5 h.p. for high spindle speeds. The spindle is quill mounted for cross adjustment. Bearings, gears, and all other parts within the spindle carrier unit are automatically lubricated by means of a combination circulating and splash system.

The walls of the bed are considerably wider



Cincinnati No. 2-24 Plain
Automatic Milling Machine



Cincinnati No. 2-24 Duplex Automatic Milling Machine

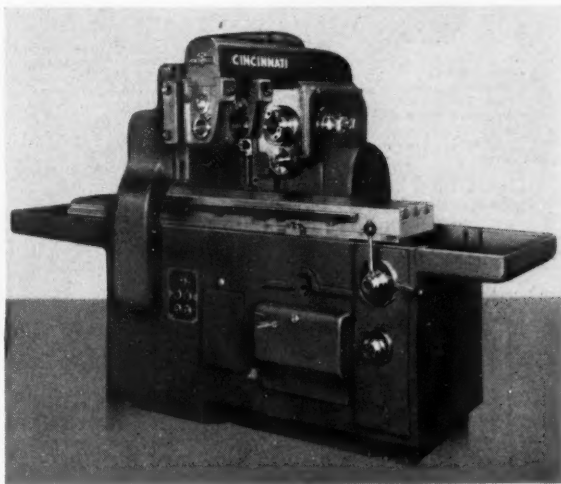
and-fall machine. This lever has three positions; namely, automatic, up and down for power manual control. The sequence of all automatic functions is controlled by the cycle selector which is an assembly of cams on a rather short, demountable shaft in the bed. Dogs control the length of stroke only. According to the manufacturer, cycle selectors have been designed for almost every conceivable automatic cycle, they may be changed in less than a minute when changing setups,

and they are interchangeable with cycle selectors for the Cincinnati No. 0-8 Automatic Milling Machine. To further reduce the user's inventory of cycle selectors, the No. 2-24 machine is equipped with a table cycle reverse device which consists of a knob extending from the front of the bed and which changes the direction of table feed and rapid traverse from right to left and vice versa. A small external control lever, operated with the

than the table, and the intervening space serves to catch the coolant and chips and to direct them to a chip compartment in the right-hand end of the bed. Table ways are automatically pressure-lubricated with filtered oil and are protected against the entrance of dirt, chips, and coolant. The standard table is extra long, 55½ inches from end to end. Dogs are provided on the underside of a rail attached to the front of the table to prevent them from being fouled with chips. The table is traversed through a conventional screw and nut arrangement and powered by a separate 2-h.p. motor mounted on hinged rails in the bed.

The lever for starting the automatic operating cycle has four power manual directional control positions; namely, rapid traverse right and left and feed right and left. In the same unit, a second lever controls the vertical traverse of the spindle carrier of the rise-

and they are interchangeable with cycle selectors for the Cincinnati No. 0-8 Automatic Milling Machine. To further reduce the user's inventory of cycle selectors, the No. 2-24 machine is equipped with a table cycle reverse device which consists of a knob extending from the front of the bed and which changes the direction of table feed and rapid traverse from right to left and vice versa. A small external control lever, operated with the



Cincinnati No. 2-24 Plain Automatic Rise-and-Fall Milling Machine

fore-finger, serves as a set-up convenience for indexing the cycle selector.

Automatic table cycles feed right or left, or alternately right and left, with a center stop position for safety. Rapid traverse is said to be at the rate of 300 inches per minute. Sixteen table feeds, ranging from $\frac{1}{2}$ to 20 inches per minute, are obtained with change gears. To protect the operator, the gears stop rotating when the hinged cover over the feed change station is opened.

The machine has 20 spindle speeds which range from 30 to 1,200 r.p.m. and

which are obtained through change gears and an externally-operated back gear.

The spindle speed change station is also equipped with a safety contact button to protect the operator should he forget to shut off the electrical current before changing gears. Vertical feeds for the spindle carrier of the rise-and-fall machine are said to be infinitely variable from 1 to 40 inches per minute. Feed cycles are initiated and synchronized with the table cycles by the cycle selector unit. Adjustable stops, engaging the teeth of a fixed rack, may be set to utilize any

portion of the 8-inch vertical range. The standard rise-and-fall machine feeds down only and rapid traverses up and down at the rate of 100 inches per minute. However, the machine can be readily arranged to feed up and down for box milling operations if required.

A built-in automatic backlash eliminator device for the table feed screw is also actuated by the cycle selector and is engaged only during the vertical feed cycle and while the table traverses at a feed rate. Another built-in feature—the automatic spindle stop—safeguards the operator while loading and unloading the fixture. This feature is also controlled by the cycle selector. In addition, a manual control is provided to disengage the automatic function.

Extra equipment available for the Cincinnati No. 2-24 Automatic Milling Machine includes automatic quill retraction as well as a cam roller attachment.

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Fixed Center Oil Circulating Spindle Head with Vertical Adjustment Spindles—Designed mainly for high speeds.

We manufacture, at lowest possible price, all types of multiple spindle fixed center adjustable and lead screw tapping heads.

Standard Fixed Center Construction. Bushed Guide Rod Holes and Lifter Rod Holes with Vertical Adjustment Spindles.

Close Fixed Center Multiple Head with Suspended Bushing Plate.



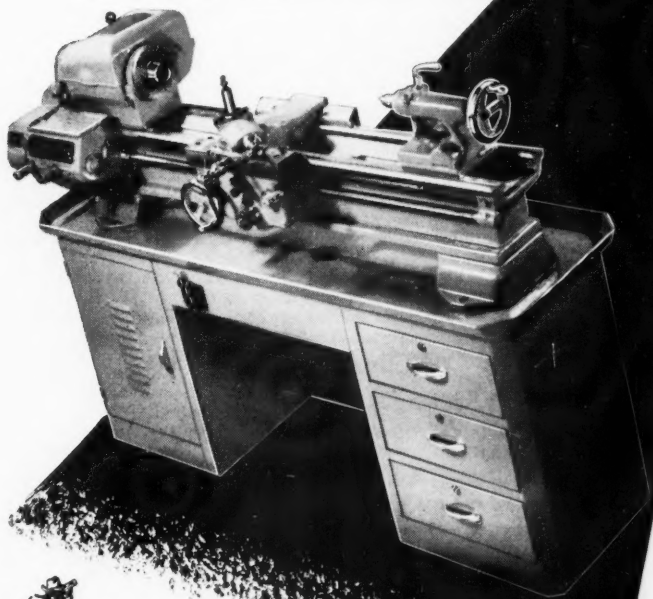
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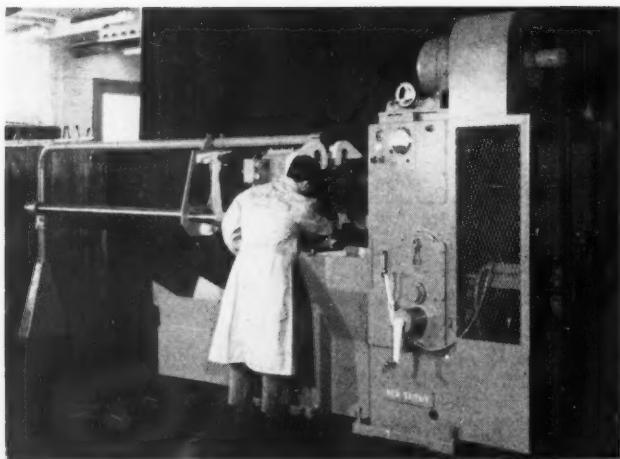
A better Lathe from any angle

Judge it from any angle: for accuracy, stamina, rigidity or capacity (for size). Check its component parts—its spindle, spindle bearings, lead screw, apron, carriage, bed, gearing, or the power delivered by its drive—you will find the SHELDON Lathe a quality tool both in appearance and "under the hood".



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Catalog

SHELDON MACHINE CO., Inc., 4250 North Knox Ave., Chicago 41, Ill.



New Britain Model 126 Single-Spindle Automatic Bar Machine

Single-Spindle Automatic Bar Machine Is Equipped with Universal Turret Cam

Designated as the Model 126, a single-spindle automatic bar machine which is equipped with a universal turret cam that is said to provide an infinite variation in feed strokes up to 6¼ inches and preselection of 10 automatically-changed turret feeds has been announced by The New Britain Machine Co., New Britain, Conn. Claimed to be easily operated, the machine incorporates four standard cross-slide cams to cover a wide variety of cross-slide feeds and offers a stepless spindle-speed variation from 80 to 1,500 r.p.m.

The Model 126 features a program drum, an automatic transmission with universal turret cam, and standard cross-slide wedge cams actuated by the turret

motion. The program drum is a central control station through which the operations of cutting off, unchucking, and stock feeding stroke are governed. The drum is divided into five sections, one for each side of the turret. Mounted on the drum are five shifter arms which, during the high-speed cycle, automatically preselect any one of the 10 feeds for each of the five turret stations. The shifter arms preselect the different turret feed gear ratios in the automatic transmission. The gear ratio rotates the main turret cam drum at a specific speed and imparts a certain feed per revolution to the turret. The automatic transmission has two ranges of five feeds each in steps from 0.003 to 0.060 inch.

The cross-slide cams are sine bars or wedges mounted on the front of the turret. When the turret feeds forward, the wedges are moved ahead under the spherical rollers on the ends of the cross-slide arms. As the rollers ride up the cams, the cross slides feed in. The cams are made in four standard ratios or sizes; namely, 1:10, 2:10, 3:10, and 4:10. A cam-setting gage is supplied with the machine so that the operator can preset the cams for the next job on the bench.

New MATHISON SELF ALIGNING STRAP-CLAMP

5" strap clamp holds work pieces up to 2" and the 8" clamp up to 3" without blocking or shims. Ball and socket arrangement make the gripping members free-floating and universal and enables the clamp to hold work pieces with inclined surfaces in any direction. Ball washer on bolt enables bolt to stay vertical. Choice territories available to distributors.



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Accurate & Easy Tapping

Thru 1½" Steel Plate!

with new heavy duty "TAP KING" Tapping Attachment

TRULY a remarkable achievement in production machinery. This rugged miracle worker weighs only 18 lbs.—yet can tap through a 1½" steel plate with an ease and accuracy never dreamed possible.

Unusual finger tip sensitivity, smooth, powerful driving power and rugged vibration free construction—enables operators to hold close tolerances on exacting large hole production jobs. Special design minimizes costly parts spoilage, tap breakage and drastically reduces operator fatigue. As a result, some users report production gains of 50% on open hole tapping in high carbon steel forgings and 100% increases on blind hole tapping in steel castings.

Other users claim more spectacular gains! Here's why: New exclusive heavy duty 17-tooth spline drive from clutch to tap holder assures rigid and smooth action; increases accuracy and uniformity, reduces strain, wear and vibration. Spindle support at both ends eliminates tap wobble; double-cone friction clutch provides sensitive finger tip control; ball and needle bearings for longer, trouble free life; reverse speed is twice forward speed; simplified oiling system; aluminum housing; PLUS many other unusual features.



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Giving full particulars on the New Tap King as well as the complete line of Procnier Tapping Machines. Learn how you can adapt them to your specific needs.

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12 S. CLINTON ST. CHICAGO 6, ILL.

April, 1953



NEW "TRU-GRIP" Tap Holder

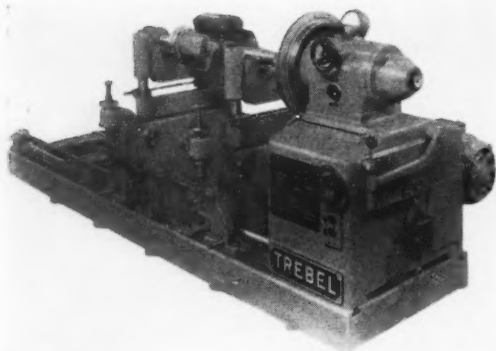
The exclusive Procnier "Tru-Grip" tap holder is lighter, smaller in diameter. It affords easier tapping close to walls or shoulders, eliminates "chewed" tap shanks. Holds tap true.

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Gentlemen: Please send your illustrated brochure on the improved line of Procnier High Speed Tapping Heads.

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Trebel Dynamic Balancing Machine

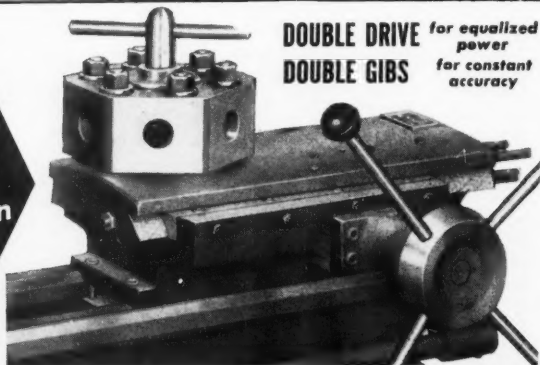
Balancing Machine Indicates Magnitude of Unbalance to Within 0.000025 Inch

Kurt Orban Co., Inc., 205 E. 42nd St., New York 17, N. Y., has announced the Trebel Dynamic Balancing Machine which is designed to indicate the magnitude, as well as the location, of unbalance

in ounce-inches to an accuracy within 0.000025 inch displacement of center of gravity. The machine consists of a bed, headstock, drive motor, and two independently movable supports. The motor and supports include open bearing rollers on which the workpiece is rotated. The height of the roller brackets is adjustable to suit different workpiece diameters. Special half-shoes for bab-bitt bearings or V-type holders for accommodating ball bearings can be supplied. The bab-bitt and ball bearings are interchangeable with the standard roller carriages.

An electronic amplifier which is housed in the headstock incorporates a filtering unit and a rectifier and, it is claimed, shows the most minute unbalance vibrations. A positive drive is made possible by the use of a carrier band, on the face-plate of the headstock, which engages a

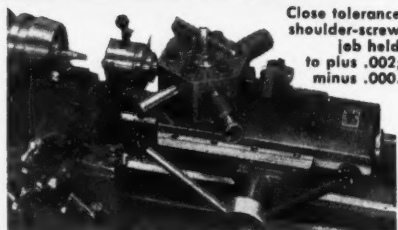
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Self-Indexing
HEXTURRET
For Lower Production
Costs and Speedier
Output



- ✓ Custom built to fit all lathes from 9" to 18".
- ✓ Smooth, sensitive control with Pilot wheel drive through twin gears and racks.

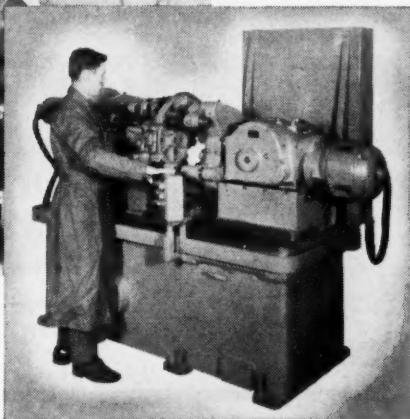
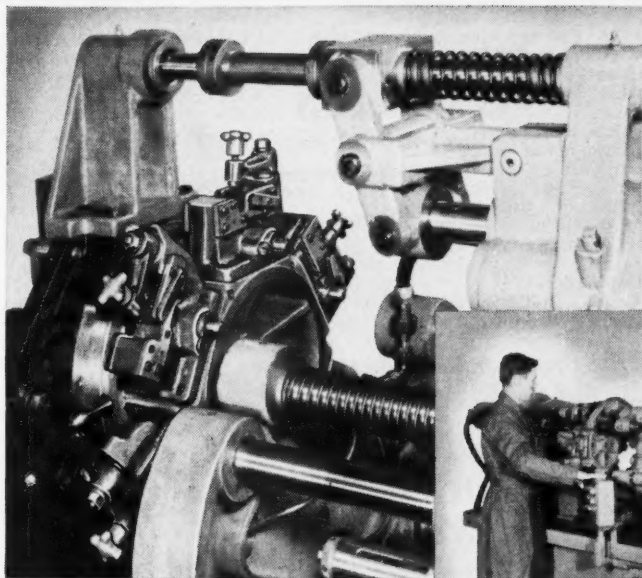
- ✓ All bearing surfaces hand scraped.
- ✓ All parts of indexing mechanism hardened, assuring accuracy.

Manufacturers of the most complete line of Hexturret Bed Turrets, Turret Tool Posts and Tail Stock Turrets in the country.
Send for Catalog No. 53.



ENCO Manufacturing Co., Dept. 143
4524 W. FULLERTON AVE., CHICAGO 39, ILL.

Reasonable Deliveries



Showing Practical Application of WESPO Parts by Large Machine Tool Builder

The use of WESPO swing clamps as an integral part of a special machine designed and produced by Hartford Special Machine Co. is an indication of the tendency of design engineers and tool engineers to standardize on WESPO clamps and components.

The nation-wide use of WESPO clamps and components is due not

only to the practical design of WESPO clamps and components, but, also, to their effectiveness in work-holding and their economy. Engineers have found that the use of WESPO components saves them up to 70% in fixture cost. Write for catalog of 15 different type clamps in 100 sizes and over 350 component parts.

WEST POINT MANUFACTURING CO.
26939 W. SEVEN MILE ROAD • DETROIT 19, MICHIGAN

simple driving dog on the workpiece. Plane selectors are placed underneath the previously determined planes of compensation of the workpiece. At these plane selectors, a cam introduces the counter-vibration which is transmitted through a spring to the nodal bar and then to the bearing supports. Two hand-wheels, one for angle and the other for magnitude, control the counter force which is introduced into the bearings on which the work rotates. By turning the wheels, the counter force is varied to neutralize the force of unbalance.

The machine is available in 11 models with capacities for work weighing $\frac{1}{4}$ to 22,000 lb. with outside diameters from 7

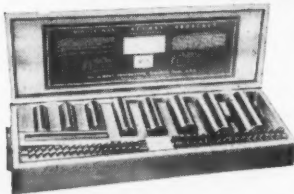
to 78 inches. Models for balancing impellers and other large-diameter work are available with capacities ranging from 2 to 22,000 lb. and with provisions for work with outside diameters from $37\frac{1}{2}$ to $98\frac{1}{2}$ inches.

High-Speed Steel Tool Bits and Cut-Off Blades

Plew Tool Co., Inc., Columbia City, Ind., has announced two high-speed heat-treated steels, designated as "Lucky 7" and "Tuf-Cut," from which the company can manufacture square and flat tool bits and cut-off blades, as well as hollow mills, form facing tools, counterbores, step reamers, seating tools, and formed facing cutters in either spiral or radial relief. The firm can also manufacture finish ground flats, squares, dovetails, and circular tools ground to user specifications.

Lucky 7 is a vanadium-type steel with a very high tensile strength and a Rockwell of C-64 to C-66. Tuf-Cut is a moly-type steel which also has a very high tensile strength and carries a Rockwell of C-64 to C-66. Square tool bits are available in sizes from $\frac{3}{16}$ inch square x 2 inches long to $1\frac{1}{4}$ inches square x 7 inches long; flats from $\frac{1}{4}$ x $\frac{1}{2}$ x 4 inches to $1 \times 1\frac{1}{2}$ x 7 inches. Tools made from Tuf-Cut are available ground or unground. Straight cut-off blades are supplied in sizes from $\frac{1}{16}$ x $\frac{1}{2}$ x 4 inches to $\frac{1}{8}$ x 1 x $6\frac{1}{2}$ inches. Special size tool bits and cut-off blades can be made to specifications.

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any size from $\frac{1}{16}$ " to
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Millers Falls powerful versatile new No. 555 Impact Tool

Sleek, powerful, compact — this new No. 555 is the most remarkable, most versatile electric tool ever developed. When torque resistance is low, it drives continuously at 1900 r.p.m. Then, automatically shifts to impact action. 2000 powerful blows per minute exert up to 100 ft. lbs. torque — ample to handle threaded parts as large as $\frac{5}{8}$ " diameter under favorable conditions. Weighs only $6\frac{3}{4}$ lbs. Rugged and easy to use. Quickly reversible. Write for full information, or better yet, let us arrange a demonstration.

MILLERS FALLS COMPANY, Greenfield, Mass.



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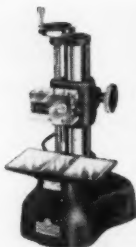
- Runs, sets, loosens and removes nuts and studs
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- Drives screws
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**Standard 1/2-inch
square drive —
wide variety of
accessories**

Instrument Has 110,000-to-1 Magnification

By combining the Universal Electro-limit Circuit and Gage Block Comparator Stand with the P&W Electronic Recorder, Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford 1, Conn., has developed an instrument with 110,000-to-1 magnification. The instrument is designed primarily for checking precision gage blocks to the millionth of an inch. The 11-inch scale of the recorder is equal to only 0.0001 inch, with each primary division equal to five millionths of an



P&W Electrolimit Millionth Comparator

inch (0.000005 inch) and secondary divisions equal to one millionth (0.000001 inch).

The Electronic Recorder is provided with a pen lifter and chart drive switch so that under normal operation it is used as an indicating instrument. However, by using the switch, the chart carriage is started and the measurements are recorded on the chart paper, providing a permanent record.

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LINLEY BROS CO.

671 State St. Ext., Bridgeport 1, Conn.

Machine Checks Lead and Axial Pitch on Gears from 18 to 48 Inches O.D.

For checking both lead and axial pitch on large helical or herringbone gears, as well as parallelism of teeth on large spur gears, Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich., has announced the Michigan "Sine-Line" Model 1248 Lead Checker. According to the manufacturer, the machine will check both lead and axial pitch on gears from 18 to 48 inches o.d. with a maximum face width of 25 inches and a maximum shaft length of 96 inches. Either right or left-hand leads may be checked. The machine utilizes the sine bar principle to check

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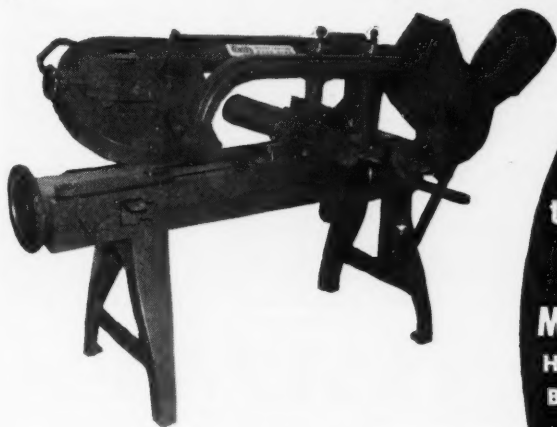
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Announcing **THE NEW WELLS Model 800**
Horizontal Metal Cutting
BAND SAW



THE NEW WELLS MODEL 800 is the first metal cutting band saw designed to capitalize on the remarkable advantages, and to be approved for use with the new MILFORD REZISTOR High Speed Steel Band Saw Blade.

Model 800, engineered for heavy duty work, provides for practical and efficient use of blades of 1" in width, especially the new High Speed Steel Band Saw Blade. This blade, used with Wells Model 800, has established new records . . . higher level of cutting efficiency . . . more cuts per blade.

Wells Manufacturing Corporation has been authorized by the producers of this new blade to supply complete information, and would be glad to study your metal cutting jobs to determine which blade, when used with Model 800, will show you cost savings in your cut-off operations.

Approved
 for use with
 the revolutionary

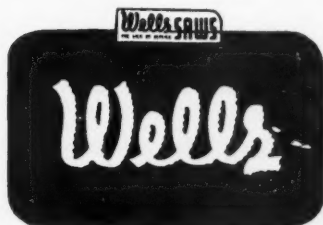
NEW

MILFORD REZISTOR
HIGH SPEED STEEL
BAND SAW BLADE

Designed for production
 cut-off work, partic-
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 stainless steel

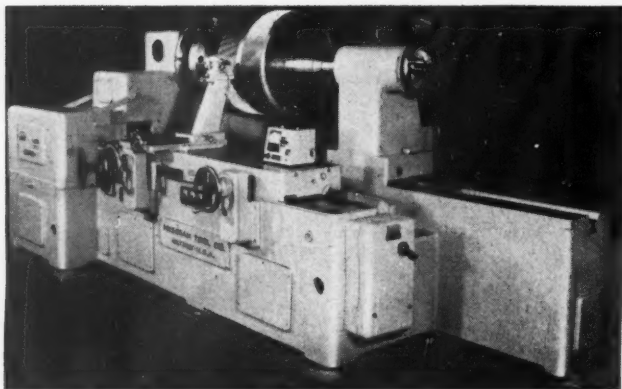
DESIGN FEATURES

- Exclusive new Wells "constant-load" blade tensioning device.
- Extra rigid, heavily built counter-balanced frame and beam.
- New style band wheels.
- Synchronized speed blade cleaning brush.
- Improved, special heavy duty blade guides.
- New expanded range of cutting speeds.
- Capacity: 8" diameter.



The Pioneers of Horizontal
METAL CUTTING
BAND SAWS

WELLS MANUFACTURING CORPORATION
 808 TYLER STREET • THREE RIVERS, MICH.



Michigan "Sine-Line"
Model 1248 Lead
Checker

leads from 0 to 80 inches, and either manual or power drive can be used in operation. No change in the mounting of the gear is said to be required to check either lead or axial pitch, and gears of varying face widths or diameters (but with the same lead) may be checked without changing the setting of the sine bar.

The machine has a large cast base for rigidity and consists primarily of two

"tables"—a transverse table carrying the sine bar that is enclosed in the left of the machine and a longitudinal table which carries the indicator. The sine bar table is arranged to move crossways of the machine at the same time the indicator table moves lengthwise, parallel to the axis of the gear being checked. The sine bar table, when moved back and forth, rotates the spindle upon which the gear is mounted. The adjustable sine bar is said to determine the relationship between the movement of the indicator table and the rotation of the gear being checked. Correct adjustment of the sine bar, it is claimed, is determined by a simple formula.

Dependable MEASURING & CHECKING EQUIPMENT

and Now

HAND WHEELS, KNOBS, HANDLES

Cadmium Plated READY TO DELIVER

Non-rusting — good looking

STRAIGHT and OFFSET TYPE

CAST IRON

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In 13 sizes, ranging from 3 x 4 x 12 and up.

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Over 50 sizes, ranging from 7 x 7 1/2 to 96 x 192.

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Wherever quality and precision of parts must meet exacting performance tests, you will find ERICKSON Precision Holding Tools an integral part of the machining set-up. ERICKSON engineers can help you obtain the highest degree of accuracy at production rates you never dreamed possible.

A typical example in the use of ERICKSON expanding mandrels is illustrated above. The photograph shows a loading stand utilizing Erickson mandrels for maintaining precision concentricity on inducers and impellers. Each Erickson mandrel accommodates a wide range of sleeves and each sleeve expands over a range of $1/32"$. Thus, one mandrel is able to handle a great variety of work.

Only ERICKSON Mandrels grip along their entire length, give positive grip and self release.

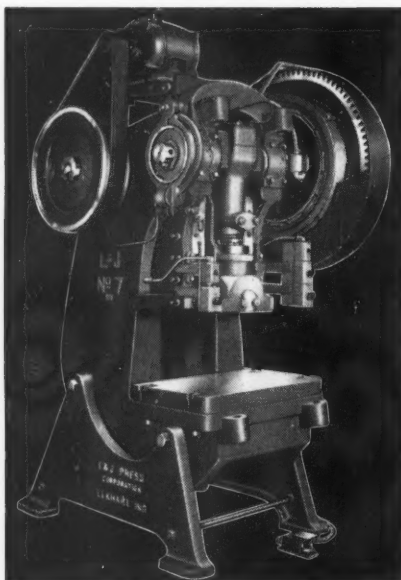
THINK OF THESE ERICKSON TOOLS IN TERMS OF YOUR PRODUCTION PROBLEMS:

- COLLET CHUCKS — prolong tool life, permit stubbing. GUARANTEED Accuracy of .0005" T.I.R. One Erickson Collet replaces 7 single purpose collets.
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L&J PRESSES

**MORE PRODUCTIVITY
AT LOWER COSTS**

The accuracy and productivity of an L&J No. 7 (80 ton) Press plus the advantages of an L&J Fawick Air Clutch* give you an ideal combination for reducing costs and improving quality of your press work. It permits maximum speeds plus greater safety and shock-free, full-power operation.

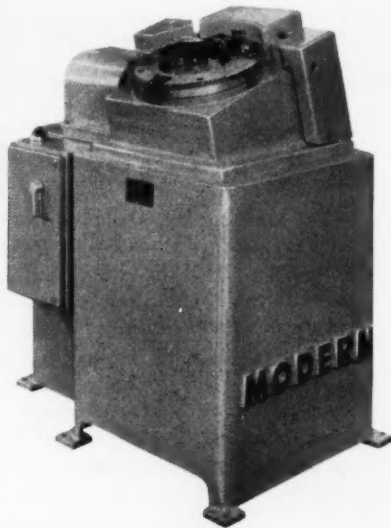
*Trouble-free because of no end thrust, no springs, no keys, no shifting parts. Pneumatic clutch element on flywheel constricts to grip drum on crankshaft flange.

6 to 80 ton models. Write for literature.



High-Speed Machine Chamfers and Deburrs Flywheel Ring Gears

Identified as the Burr-Master Model BM-2029, a high-speed machine specifically designed for chamfering and deburring flywheel ring gears has been announced by Modern Industrial Engineering Co., 14230 Birwood Ave., Detroit 4, Mich. In use, the gear is loaded into the machine by slipping it over three rolls on the fixture, and into mesh with a drive gear. A locating finger, moving with the cutting tools, automatically locates the gear teeth radially on each stroke of the



Burr-Master Model BM-2029 High-Speed
Chamfering and Deburring Machine

form-type cutting tools, thus compensating for any out-of-round condition or flatness variation.

With the drive gear indexing continuously, chamfering begins as soon as the gear to be cut is meshed with it. A combination rocker arm motion actuates the form tools to provide a generated cutting action, which enables the tools to chamfer and deburr all tooth edges well around the root of the gear tooth, leaving a burrless chamfered surface. Depth of cut is readily adjustable. Automatic indexing takes place during the return stroke of the tools. With the tools reciprocating at 5 strokes per second and chamfering 4

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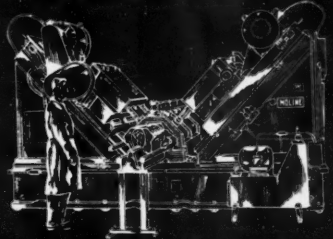


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CARROLL DIVIDING HEAD CO.
 3525 Cardiff Ave., Cincinnati 9, Ohio

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MACHINE TOOLS
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• **FASTER SPEEDS**
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MODEL JA
50,000 R.P.M.
 Weight 12 ounces, length
 6 3/4 inches, chuck size
 1/8 inch. Wheel guard re-
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The RPM's stay up while grinding . . . not only when the grinder runs idle.

It is an established fact that surface speeds must stay up to approximately a mile a minute if you want to grind . . . not just rub. Every mechanic knows this, but an inexperienced buyer may order tools that maintain proper grinding speeds only when running idle. The speed of Kipp air grinders drops but slightly when put to work. That means better work . . . longer wheel life.

MADISON-KIPP CORP.

208 Waubesa St., Madison, Wis., U.S.A.

Write for KIPP Air Tool Catalog at 3006

teeth with each stroke, the cutting rate is 20 teeth per second. When the cutting cycle is complete, a cycle indicator light signals that the gear is ready for removal. The operator depresses a lever to eject the gear by lifting it up and out of mesh with the drive gear.

The machine base is of fabricated roll-edge box construction for maximum strength and rigidity with minimum weight, and the head frame is made of alloy cast iron. Design features include special alloy bronze rocker arms, an overload clutch that prevents damage to machine parts in the event of accidental overloads, and a precision indexing mechanism operating in a bath of oil. All wear parts are hardened and ground, and all electrical equipment is designed to J.I.C. standards. The floor space required for the machine is 26 x 34 inches, with a working height of 42 inches. The machine weighs approximately 2,300 lb. and is powered by a 1/2-h.p. 1,800-r.p.m. motor.

Punches and Chisels

J. H. Williams & Co., 480 Vulcan St., Buffalo 7, N. Y., has announced the addition of cape chisels, diamond-point chis-

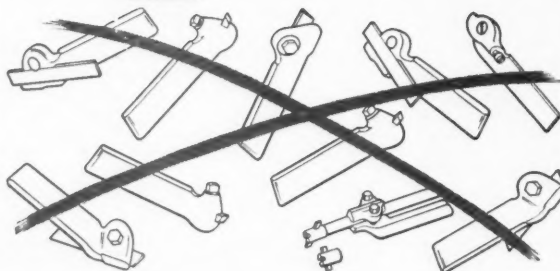


Williams Punches and Chisels

els, round-nose chisels, extra-long cold chisels, and pinch bars to its line of punches and chisels. The tools are forged from high-grade octagonal alloy steel and are properly hardened and tempered for long life. The complete assortment is available in a wide range of sizes.



ONE ALL-PURPOSE TOOL HOLDER INSTEAD OF TEN



ONE tool holder for all positions . . . No tool chatter . . . can do internal boring or internal threading . . . Ideal for carbide tools . . . Bit sizes: 1/4", 5/16", 3/8", 7/16", 1/2", 5/8".

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NEW YORK 7, N. Y.

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Headless
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Screws

Socket
Set Screws



Try Them On Your Next Job!

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Letters and figures deep-cut in hardened, special formula steel assure clean impressions and long service. Faces are angled for added strength.

Chamfered corners make it easy to locate the base. At your mill supply house or write for circulars.



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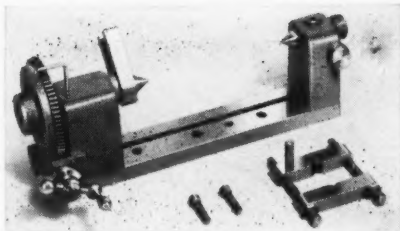
For product trademarking or identification. Any style of lettering, designs, pictures, developed from your sketch or print. Straight or reverse. For hand or press. Whenever you get calls for marking dies, write us for prompt service.

HOGGSON & PETTIS MFG. CO.

New Haven 7, Conn.

Indexing Center Handles up to 5 Inches in Diameter and 6 Inches in Length

South Bend Lathe Works, South Bend 22, Ind., has announced an indexing center which is designed for small precision work and which can handle stock up to 5 inches in diameter and 6 inches in length. Ideal for dividing operations, such as machining splines, flutes, and gears, the indexing center is also said to be useful for milling, shaping, and grinding squares, hexagons, or odd angles. Accurate cross-drilling, it is claimed, can



South Bend Indexing Center

be held to close tolerances with the center.

Equipped with a graduated collar, a ball crank and worm gear turn the head center. Each graduation indicates a center movement of three minutes while a complete turn of the ball crank revolves the center five degrees. An easily read dial on the worm wheel is graduated into 360 degrees. For quick positioning of the center, the worm gear can be disengaged and a clamping device locks the head center in any desired position. A plunger-type tail center with automatic spring tension is said to permit the removal of the workpiece without disturbing the head center. A knurled thumbscrew securely locks the tail center while work is being performed.

MASTERCRAFT Rotary Tables



Model 700-R is an improved combination slide and rotary table for use on either the miller table, drill press or lathe face-plate. Table 7 1/2" dia. Rotates through 360°. Height 4 3/4" overall.

Write for circulars describing this and other models.

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GRANT RIVETERS



• Pioneers in the riveting field. Head rivets from smallest to 3/4" diameter, either by noiseless spinning or vibrating hammer method.—Sizes to meet all needs.—Types include Vertical and Horizontal Multiple Spindles. Write for literature—and don't forget to send samples.

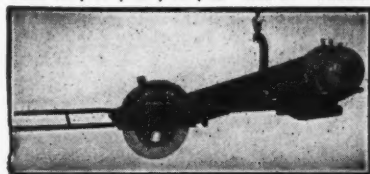
THE GRANT MFG. & MACHINE CO.
96 Silliman Ave. Bridgeport 5, Conn.

Volatile Solvent May Be Applied by Spraying, Brushing, or Dipping

Designated as Molykote M-88, a dispersion of near-colloidal particles of Molykote powder, combined with an organic binder in a volatile solvent, has been announced by The Alpha Corp., 174 Hamilton Ave., Greenwich, Conn. According to the manufacturer, the solvent may be applied to clean surfaces, metals or non-

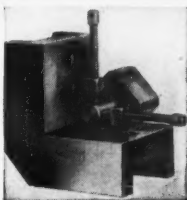
MUMMERT-DIXON SWING FRAME GRINDERS

Sizes 12", 14", 16", 18", 20" and 24" wheels.



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120 Philadelphia St. • Hanover, Pa.

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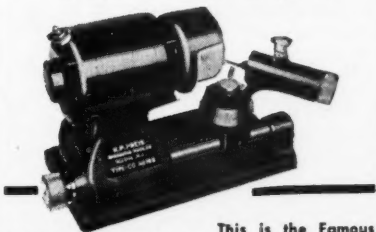


Save costly set-ups in holding small work. All surfaces ground square with their opposite and right angle faces . . . to assure a perfect job on removal from block. Square sliding clamps are fitted to broached holes for easy removal. Furnished with two long and two short sliding clamps. Write for folder.

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and Radius Emery Wheel Dressers

TALLMAN TOOL & MACHINE CORP.
ROCHESTER NEW YORK

PRECISION CUTTER GRINDERS



This is the Famous PREIS-PANTO Model CG Single-Lip Engraving and Routing Cutter Grinder. Surprisingly low in price because of the high-production basis of manufacture.

PANTO

Easy to use because of simplicity of design and SURE to give true centers on your cutters.

H. P. PREIS ENGRAVING MACHINE CO.
657 U. S. Route 22, Hillside, N. J.

NUMBERALL

CUTS THE COST OF STAMPING NUMBERS

SELECTIVE NUMBERING HEADS

Press
Style
Model
83

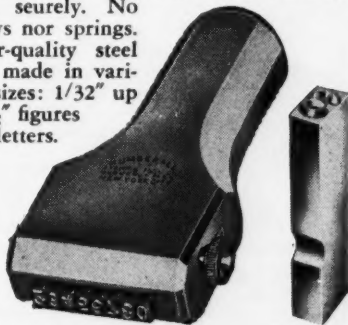
All wheels
• QUICK SET



Model 83 Heads for all stamping operations requiring quick selective numbering. Wheels engraved with direct sight figures at front of machine. Set to the required character by turning the knobs. By pushing the knobs right or left anyone of the wheels may be engaged. Indexed wheel selector knob serves as a positive stop for every wheel. 1/16" to 1/4" size figures. Letter wheels, with up to 11 letters and a blank on each wheel can also be supplied. Heads are more efficient and durable than old style lever machines. Furnished in sizes from 1 to 15 wheels. Bulletin M583.

IMPROVED TYPE HOLDERS

Hand or Press style. Type can be easily, quickly loaded and unloaded. Simplest construction . . . Just a sturdy pin holds the type securely. No screws nor springs. Super-quality steel type made in various sizes: 1/32" up to 1/2" figures and letters.



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Steel Type

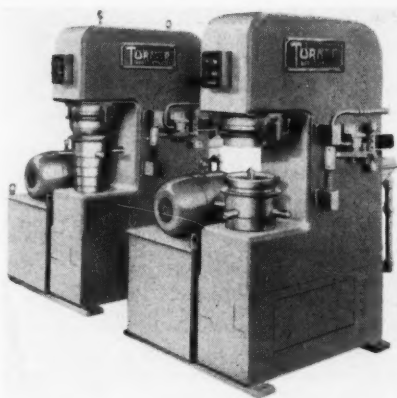
NUMBERALL STAMP & TOOL CO.
HUGUENOT PARK STATEN ISLAND 12, N. Y.

metallic materials, by spraying, brushing, or dipping and will evaporate leaving a tenaciously-bonded coating of Molykote ranging from 0.0003 to 0.0007 inch in thickness.

Maximum uniformity and minimum thickness of the coating are said to be obtained if parts are sprayed while heated to 300 deg. F. This, it is claimed, speeds up evaporation of the solvent and minimizes the running of the liquid film, especially on non-horizontal surfaces. The solvent is said to be particularly useful wherever a heavy and long-lasting dry lubricating film is more desirable than can be obtained with Molykote Type Z powder, besides facilitating the use of the lubricant on surfaces where it is difficult or impractical to apply Molykote by rubbing.

Hydraulic Assembly Press Is Designed for Accurately Maintaining Center Distances

Specifically designed for accurately maintaining center distances in assembling inner portions of fluid couplings, a 50-ton precision hydraulic assembly press has been announced by Turner Bros. Inc.,



Turner 50-Ton Precision Hydraulic Assembly Presses

2625 Hilton Rd., Ferndale, Mich. The press incorporates an indicator which, it is claimed, sets the ram. The stroke is said to be electrically and hydraulically controlled so that the assembly of the tree members is accurately maintained.

DEALERS
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Our
PROPOSAL



Exclusive
3-Way
Travel

The BARKER "MILLER"

PRECISION - PRODUCTION - ECONOMY

Pre-loaded, double row ball bearing spindle. at a rapid rate by inexperienced operators. Easy set-up for small run jobs. Second to none.

**Priced Under
\$350.00**

MASSIVE, HEAVY HEAD
and table to allow fast cuts without chatter.

**Complete as
Shown, Ready
to Operate.**

PRODUCTION
MODEL

You can easily effect a 50% economy in the milling costs of small parts with this versatile machine.

Designed and built for holding close tolerances on big run jobs. Hundreds in use in large plants from coast to coast.

The "BUY"-WORD for small parts milling jobs is "BARKER MILLER."

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BARKER ENGINEERING COMPANY

500 GREEN ROAD
CLEVELAND 21, OHIO

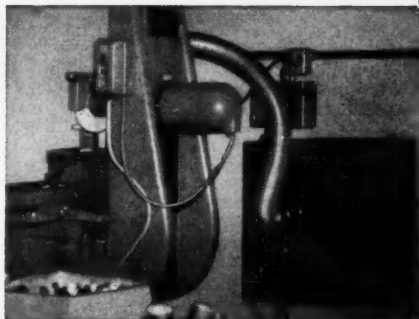
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DUSTKOP

Available from stock of
22 standard models
300 cfm to 10,000 cfm

for: Surface Grinders, Tool and Cutter Grinders, Polishers and Buffers; Abrasive Belts and Discs; Woodworking and Plastic Industry Equipment . . . DUSTKOPS collect almost all kinds of industrial dusts.

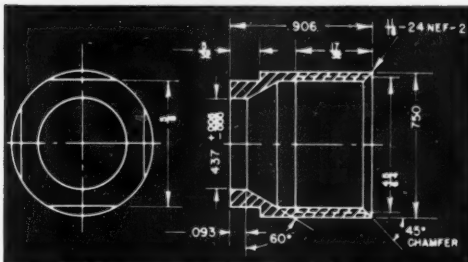
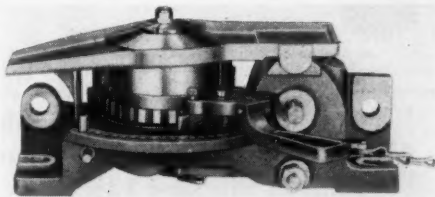
Ask for Catalog 605-2. Describe dust problem for recommendation by return mail—no obligation.



AGET-DETROIT CO.

207 Main St. Ann Arbor, Mich.

CUT COSTS ON SECONDARY OPERATIONS WITH THE DEARBORN AUTOMATIC CHUCKING AND INDEXING FIXTURE



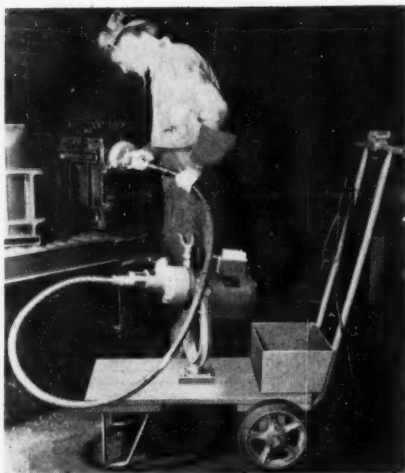
• Work is held by collets which grip round, hexagon or square shapes up to 2" dia. Collets are opened and closed automatically by the forward and backward motion of milling machine table or drill head. Work is automatically ejected from collet after last cut by bringing machine table back further.

• Write for complete details.

J. W. DEARBORN
ANSONIA • CT • CONN.

Truck-Mounted Unit for Strand Flexible Shaft Machines

Franklin Balmar Corp., N. A. Strand Division, Woodberry, Baltimore 11, Md., has introduced a portable truck-mount unit for its line of Strand Flexible Shaft Machines. The truck mount consists of a hand truck with a wheeled rear axle and front skids. According to the manufacturer, the flexible shaft unit is mounted on the deck of the truck in such a position that one operator can easily push the unit from place to place by merely pressing down on a handle to lift the front skids from the floor. The handle of the unit is equipped with a fixed clamp that holds the handpiece and tool of the flexible shaft machine. Thus, the equipment can be used as a fixed bench tool or a portable unit.



Strand Portable Truck-Mount Unit equipped with a "Strandflex" 4-Speed Gear Drive Flexible Shaft Machine

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The deck of the truck is fitted with a metal box for carrying a complete set of tools and attachments along with the machine. The rear wheels of the truck are equipped with ball bearings and rubber tires which are said to provide smooth rolling.

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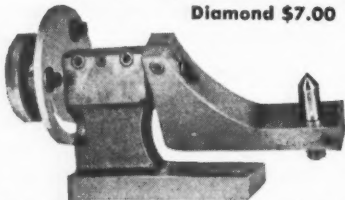
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Precision Ground Surfaces. Can be set very accurately with a Protractor or Sine Bar. Works underneath the wheel. Large bearing surfaces.

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5/32" x 12"	2.06
11/64" x 12"	2.06
3/16" x 12"	2.06
13/64" x 12"	2.19
7/32" x 12"	2.19
15/64" x 12"	2.40
1/4" x 12"	2.40
17/64" x 12"	2.55
9/32" x 12"	2.55
19/64" x 12"	2.75
5/16" x 12"	2.75
21/64" x 12"	3.11
11/32" x 12"	3.11
23/64" x 12"	3.46
3/8" x 12"	3.46
25/64" x 12"	3.81
13/32" x 12"	3.81
27/64" x 12"	4.17
7/16" x 12"	4.17
29/64" x 12"	4.52
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1 1/2	19.50
2	24.00
3	34.50
4	52.50

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149MM Grand St., New York, N. Y.

Welding Process Utilizes Two Electrodes to Increase Speed of Automatic Welding

Designated as "Twinarc," a welding process which employs two small electrodes to increase the speed of automatic welding operations has been developed by The Lincoln Electric Co., Cleveland 17, Ohio. The two electrodes are fed simultaneously through a single head and a single jaw. Both electrodes deposit metal in the weld crater. The high currents possible with the two electrodes are said to increase the rate of metal

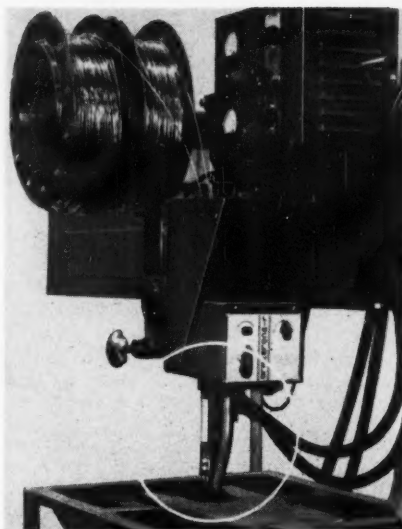


Illustration showing a standard Lincolnweld head adapted for use with the "Twinarc" welding process

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deposition, the amount of penetration, and, consequently, welding speeds. The welding process is recommended for use on butt or fillet welds in $\frac{1}{4}$ -inch or thicker plate where the application is normal for automatic hidden or submerged arc welding.

A special electrode jaw, wire feed rolls, and wire guides are said to adapt any standard Lincolnweld head for using two electrodes. The standard single head controls are used, as well as the standard d.c. welding current generators. Currents up to 1,500 amperes can be used with Twinarc welding for which two gener-

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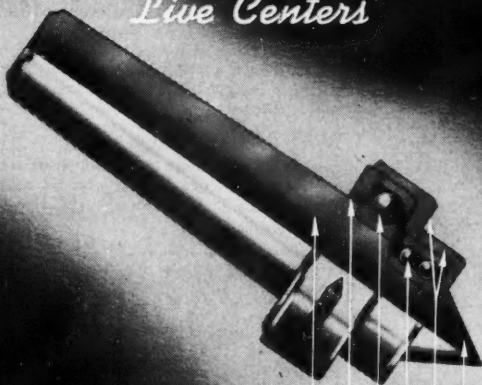
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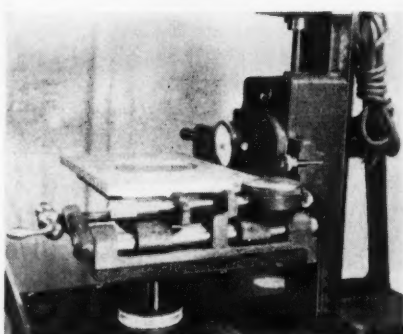
**STURDIMATIC
TOOL COMPANY**

3904 F STREET • DETROIT 16, MICH

ators may be paralleled or a single 1,500-ampere unit may be used. The two-wire head, it is claimed, will feed electrodes in $\frac{3}{4}$, $\frac{3}{8}$, and $\frac{1}{8}$ -inch diameter sizes.

Universal-Type Coordinate Stage Is Equipped with Independent Measuring Controls

A universal-type coordinate stage designed for use on the Portman Model C-100 Optical Comparator has been announced by Portman Instrument Co., Inc., New Rochelle, N. Y. The stage is



Portman Universal-Type Coordinate Stage installed on a Portman Model C-100 Optical Comparator

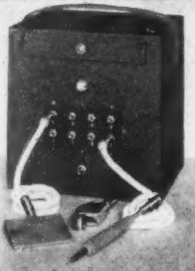


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equipped with independent measuring controls consisting of a combination of two dial indicators and two micrometer spindles for both longitudinal and transverse travel measurements. A travel of $1\frac{1}{2}$ inches longitudinally and 1-inch transverse are said to be obtainable with the stage, and the entire stage unit is adjustable for helix angle positioning to 10 degrees either side of the center.

The entire stage assembly incorporates a "swing-away" feature which is said to facilitate the change-over of lens units from one magnification to another without disturbing any work setups on the stage. The stage working platform area measures 6 inches wide x $9\frac{1}{4}$ inches in overall length and is equipped with a 4-inch diameter removable glass stage insert disc for the convenient location of parts to be inspected. A standard Portman Center Stage used for holding parts between centers is said to be adaptable for use in conjunction with the coordinate stage.

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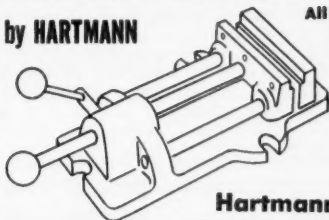


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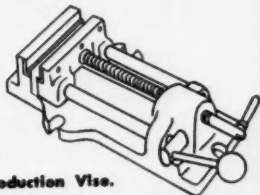
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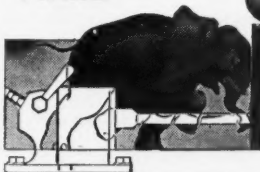
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Hartmann Mfg. Co., 1637 Goold St., Racine, Wis.

Cut Costs With **MEAD MIDGET AIR CLAMPS**

**Horizontal and
Vertical**



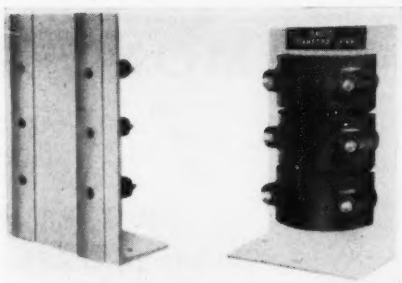
Both models deliver 80 lbs. pressure on a line pressure of 100 lbs. They'll save countless man-hours in assembly operations involving welding, riveting, bolting, etc. **Advantages over mechanical clamps:** 1. Any number can be operated by single master valve. 2. Easily installed in cramped corners. 3. Equal ram pressure at any stroke point. Send for new Mead AIR POWER Catalog, describing our line of Air Clamps, Air Vises, Air Presses, Work Feeders, Valves, Controls, etc.

MEAD SPECIALTIES COMPANY

4114 N. KNOX AVE. Dept. AA-43 CHICAGO 41, ILL.

Device Automatically Separates Stacked Steel Sheets

A unit comprising a permanent magnet that induces a magnetic field in stacked steel sheets which tend to repel each other, causing the ends of the sheets to fan out with air space between them, has been announced by Basco Mfg. Co., 5 Woodside St., Stamford, Conn. According to the manufacturer, coatings of grease, oil, paint, and so on, on the steel sheets will not effect the action of the separator, thus making it ideal for feeding presses, brakes, shears, and other metal-fabricating machinery.



Basco Sheet Steel Separators

JIG BORING

WE HAVE

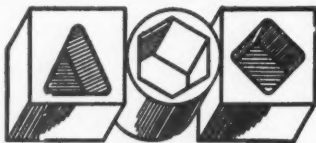
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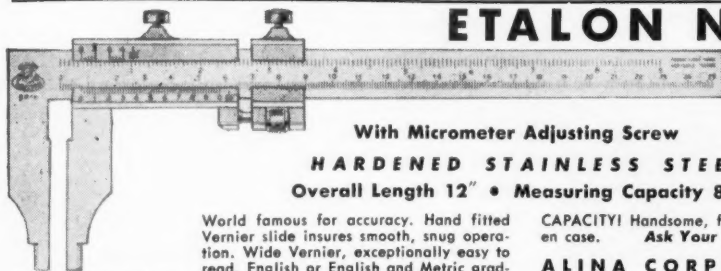
WATTS BROS. TOOL WORKS
Wilmerding, Pa.

The separator is a completely self-contained unit requiring no outside connections and incorporating cast aluminum mounting plates reinforced with stainless steel wear strips. The separator is available in four models designed to handle sheets of 20 gauge and lighter to heavier sheets than 12 gauge.

Machine Performs Cutting-Off Operations without Burr or Frazzle

Ballinger, Division of Douglas Export-Import Corp., 17 Battery Place, New York 4, N. Y., has announced a high-speed eccentric-head hydraulic-surge cut-off machine which is said to cut without burring or frazzle and without creating heat or heat hardening. The abrasive wheel is supported and driven by a hollow shaft in which is located an eccentric fitting and a smaller internal shaft which drives the eccentric mechanism. According to the manufacturer, this set-up causes the abrasive wheel to be eccentric to the main shaft.

A segment of the cutting wheel is encased in a removable housing which contains integrally cast radial vanes. The



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ETALON No. 9

With Micrometer Adjusting Screw

HARDENED STAINLESS STEEL

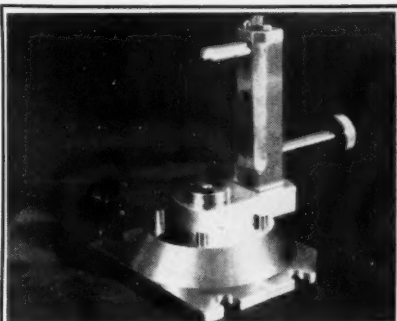
Overall Length 12" • Measuring Capacity 8 1/2"

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Featuring: accuracy held to .0001 radius tolerance. When dressing radii on surface, external or internal grinders up to 8" wheel. Holds diamonds from 3/16" to 1/2" diameter, 1 1/8" male or 2" female radius. Holder can be stopped at any radius point, with positive stops at 90 and 180 degrees. Hardened, ground and lapped tool steel. Base 4" x 5", height 5 1/2". A sturdy, rugged unit for precision service. Write for details and prices. Dealer inquiries invited.

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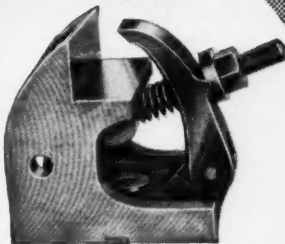
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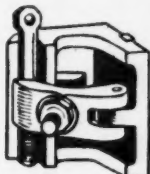


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Many special set-ups can be handled with these inexpensive, versatile fixtures. Hold round, hexagonal, octagonal or square stock, aligning work with machine. Value proved for years in large and small shops.

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4 sizes hold stock from 1/2" to 4 1/2". Any size holds smaller stock with shims.

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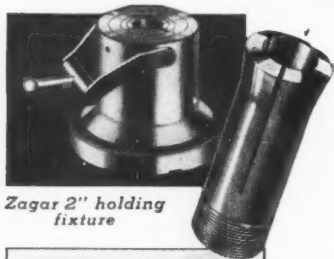
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Help every machine on your floor, new and old, towards accuracy and output with rigid-gripping Zagar holding and indexing fixtures. Since 1937, proven design and thorough craftsmanship have underwritten every investment in Zagar fixtures. Zagar also has a complete line of air-operated holding fixtures and collet lathe chucks.

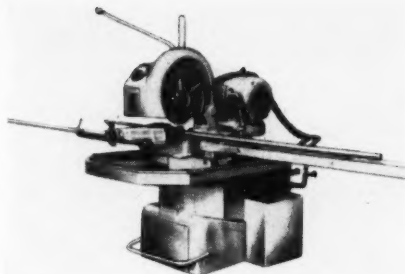
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Ballinger Abrasive-Wheel Cut-Off Machine

coolant is supplied by a normal coolant pump to each half of the housing guard. The rotation of the wheel builds up a water pressure between the faces of both the wheel and the guard, efficiently cooling and affording a definite measure of hydraulic stream to reduce blade oscillation to a minimum.

Polishing and Buffing Lathe Has Speed Range of 1,500 to 3,000 R.P.M.

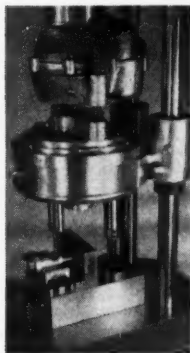
Designated as the Model 10 VRO, a variable-speed 10-h.p. polishing and buffing lathe for heavy polishing and buffing operations has been announced by Hammond Machinery Builders, Inc., 1615 Douglas Ave., Kalamazoo 54F, Mich. The lathe, it is claimed, has a speed range of from 1,500 to 3,000 r.p.m. According to the manufacturer, the speed of the lathe can be changed instantly while the lathe is running simply by turning a dial control.

Hammond Model 10 VRO Variable-Speed Polishing and Buffing Lathe



Lead Screw Head

A self-contained lead screw multiple tapping unit, marketed under the trade name Ettco-Emrick, for the tapping of two or more small holes with lead screw protection on any drill press has been announced by Ettco Tool Co., Inc., 594 Johnson Ave., Brooklyn 37, N. Y. According to



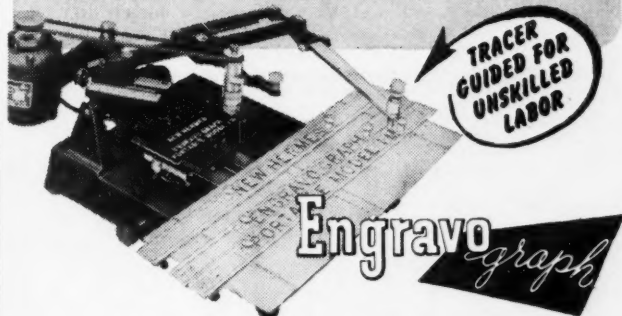
Ettco - Emrick Lead Screw Multiple Tapping Head

the manufacturer, the multiple tapping of holes is possible with the unit even though tap sizes, pitches, or both are not the same. The unit, consisting of a reversing head, a 3-spindle multiple head, and a fixture, taps two 0-80 holes in aluminum. The lead screw, having a fast pitch, is said to run slower than the taps and is completely enclosed during operation.

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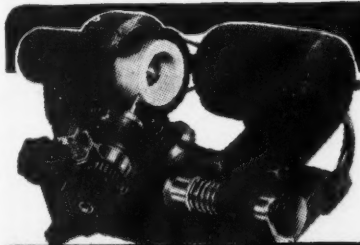
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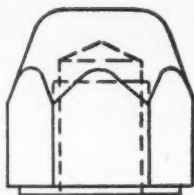
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NEW HERMES, INC.

13-19 University Place, N.Y. 3

Acorn Nut

An acorn nut for use in the construction of jigs, fixtures, and other tooling applications has been added to the line of tool components manufactured by Reid Tool Supply Co., 709 Baker St., Muskegon Heights, Mich. The nut is made of hexagon cold-finish steel, carefully ma-



Reid Acorn Nut

chined and case hardened. The contact surface is said to be square with the thread. The nut is zinc plated for appearance and rust prevention and is available in several sizes to cover the sizes which are normally required.

Pneumatic Drill Constructed for Heavy-Duty Operations

Designated as the PD-304P, a pneumatic drill which is lightweight and compact in design and which is specifically constructed for heavy-duty operations with maximum power on continuous runs has been announced by Mall Tool Co., 7814 S. Chicago Ave., Chicago 19,



Mall PD-304P Heavy-Duty Pneumatic Drill

Ill. A contoured pistol grip, trigger throttle, and built-in speed regulator are combined for easy and efficient handling.

The Mall PD-304P Heavy-Duty Pneumatic Drill incorporates a built-in oiler, and moving parts glide on precision ball bearings. The drill measures 6 $\frac{1}{2}$ inches long x 2 $\frac{1}{4}$ inches wide x 6 $\frac{1}{2}$ inches high and weighs 3 lb. The drill is supplied with a $\frac{1}{4}$ -inch Jacobs chuck, key, wrench, hydraulic fitting, $\frac{1}{4}$ x 8-inch air hose, and lubricant.

Talide

(TUNGSTEN CARBIDE)

THE WORLD'S HARDEST METAL

1 Many times more durable than steel, it adds years of life to the wearing edges of tools, dies, machinery and equipment.

2 Hard as a diamond and almost indestructible, it triples output per man and per machine.

3 New heavy-metal alloy (17.5 specific gravity) has proven best for atomic radiation screening and for applications requiring maximum weight in minimum space.

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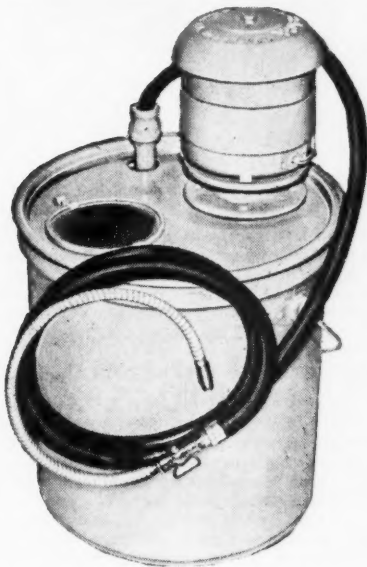
DIAMOND WHEELS
AND DRESSERS

HEAVY-METAL

GAGES

Medium-Duty Portable Coolant Pump Has Capacity of 12 G.P.M.

Designated as the Model 8-5, a medium-duty portable coolant pump which is said to be capable of pumping 12 g.p.m. against a 4-foot head and 5 g.p.m. against an 8-foot head has been announced by Shellback Mfg. Co., 11831 Hamilton, Detroit 3, Mich. Designed for machines without built-in coolant pumps and not requiring an extreme capacity, the pump is a self-contained unit of centrifugal de-

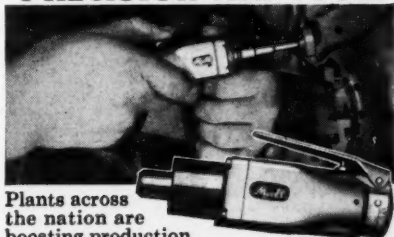


Shellback Model 8-5 Medium-Duty Portable Coolant Pump

sign with a full-floating balancing impeller and cast aluminum housing. The pump contains no bearings and is said to be self-relieving, thus preventing strain on the hose when the valve is shut off. The coolant is drawn into the pump from the top and bottom, neutralizing all thrust.

The unit incorporates a heavy-gauge steel tank, which has a 5-gallon capacity, and is equipped with a chip screen and heavy ball handle. The pump measures 21 inches high x 11 inches in diameter and is supplied with a 1/15-h.p. motor, neoprene hose, flexible nozzle, and cord and plug for 110-volt a.c. single-phase circuit.

NEW featherweight PRODUCTION MALL CHAMPS PRECISION AIR TOOLS



Plants across the nation are boosting production—lowering costs—reducing worker fatigue with MALL Pneumatic Tools. The reason: abundant, vibrationless power; streamlined featherweight design; top-quality construction. Above is the new MALL PG-K-1030L Die Grinder weighing only 12 ounces. Guaranteed speed 30,000 rpm. with less than .0015 collet runout for extreme accuracy—a typical example of the precision engineering in MALL Air Tools.



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MU-8

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MALL TOOL COMPANY

7814 S. Chicago Ave. Chicago 19, Illinois

Tool Stand Is Designed for Use Alongside Machine

Designated as the Model No. 990-M, a tool stand which is designed for use alongside a machine for convenience has been announced by Industrial Bench & Equipment Mfg. Co., Inc., 98 South St., New Britain, Conn. The stand features electrically-welded joints for maximum rigidity and can be equipped with one, two, or three trays. The trays and legs of the stand are fabricated from 1/4-inch steel. The unit can be supplied without drawers or with one, two, or three draw-



Industrial Model No. 990-M Tool Stand

ers which measure 18 x 16 x 5 inches each. The stand is available in a variety of sizes with feet or quick-facing casters, measures 29 x 18 x 27 inches overall, and is finished in a standard green color.

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COOLING
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**SPEED,
ACCURACY,
ECONOMY**

Automatic adjustment speeds up production in multiple operations with push-out type HALL COLLET CHUCKS. Full spindle capacity or over. Tremendous grip over or under stock size to .007—without adjustments. All grip...no slip. No bearings...no heat or lost power. Instant release without stopping lathe.
SATISFACTION GUARANTEED!

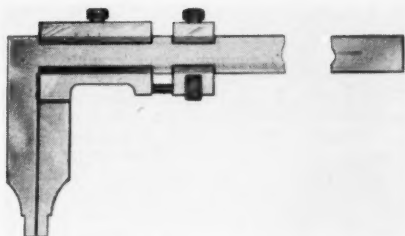
Made in Two Sizes to Fit Your Requirements:
Model A...1" (max. capacity 1-1/16")
Model B...2" (max. capacity 2-1/16")
Round, square or hexagon collets, plain or serrated
No. 3 Collet Pads Now Available
Write today for illustrated catalog and price list—Dept. B-4.
HALL MANUFACTURING COMPANY
673 TULAROSA DRIVE, LOS ANGELES 26, CALIFORNIA

Vernier Slide Caliper Available in Sizes from 10 to 96 Inches

Made of hardened chrome steel with sharp, accurate machine-divided 1/1000th-inch graduations, the Schweitzer Vernier Slide Caliper which is available in sizes ranging from 10 to 96 inches is now being marketed by Glogau & Co., Inc., Dept. Q, 1914 Birchwood Ave., Chicago 26, Ill. According to the manufacturer, the jaws are hardened, ground, and lapped, and vernier slides are fitted tightly and smoothly. The caliper is supplied with a

GEM VISES

Made in a range of sizes and types, to handle most any kind of machining operation, where vises are applicable. Write for circular, etc.
J. E. MARTIN MACHINE WORKS, Springfield, Ohio



Schweitzer Vernier Slide Caliper

wooden case to protect it from dirt and damage.

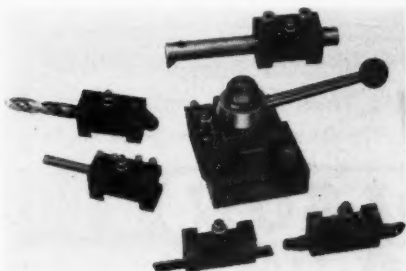
Also available is a similarly-made vernier height gage which can be furnished in sizes ranging from 12 to 48 inches.

Tool Post Fits All Lathes

Aloris Tool Co., Inc., 80-82 Fourth Ave., New York 3, N. Y., has announced a tool post which, it is claimed, will fit all lathes regardless of style of compound rest top. The tool post is supplied with five quickly-interchangeable toolholders, one for turning, one for threading, one for drilling, one for cutting off, and one for boring. The toolholders can be changed in a matter of seconds by simply sliding out one holder and slipping in another to the exact original preset position without changing the setup, thus permitting the resharpening of the tool bits right in the holder. A stud screw is provided on each toolholder for precision height adjustments.

The tool post is available in three sizes with tool-bit capacities ranging from $\frac{1}{4}$ to 1 inch and capacities for boring bars from $\frac{1}{4}$ to $1\frac{1}{2}$ inches.

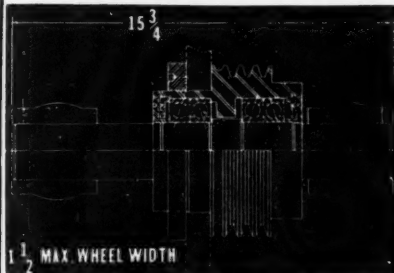
Aloris Tool Post and Toolholders



For Finest Finishes And
Squarest Shoulders Use

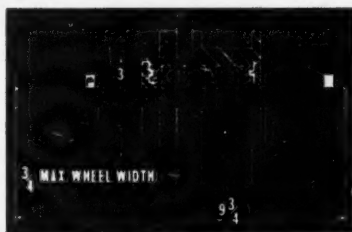
Whitnon INTERCHANGEABLE SPINDLES

For Brown & Sharpe Universal Grinders



Stocked For #2, 3, 4 Universals

No more plain bearings to scrape and run-in. Preloaded precision ball bearings allow no end shake. Wheels and belts are changed without exposing the bearings to grit and disturbing the adjustment. The bearings are grease lubricated and sealed at assembly. Write today for price and delivery for B&S #1, 2, 3, 4 Universal Grinder spindles.



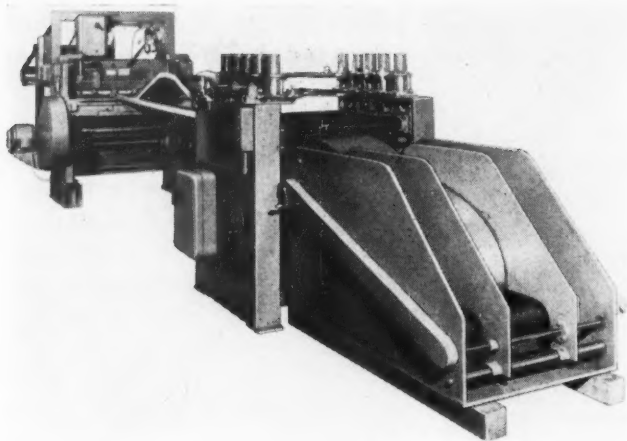
Stocked For #1 and #11 Universal

Inquiries regarding standard or special Spindles for grinding, milling, boring and drilling operations receive immediate attention.

The Whitnon MANUFACTURING CO.

217 High St.

New Britain, Conn.



Union Automatic De-Coiler and Shearing Machine

Machine Is Designed to De-Coil, Level, Shear, and Stack Automatically

A machine which is designed to de-coil, level, shear, and stack automatically and which requires only one attendant has

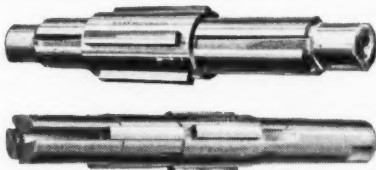
been announced by Union Tool Corp., Warsaw, Ind. According to the manufacturer, the machine will handle any flat material, such as steel, aluminum, and so on; will work steel coils up to 13 gauge; will handle widths from 6 to 60 inches; and can be set to shear lengths from 6 to 60 inches with a plus or minus variation of $\frac{1}{8}$ inch. Only one adjustment is said to be required to change lengths.

Sheared pieces, it is claimed, are stacked automatically in orderly piles ready for removal. Operating speeds are up to 150 l.f.p.m., depending upon the length to be cut.

Nicholson Expanding Mandrels

**SAVE TIME LOST
Providing Solid Arbors**

Records in many shops show Nicholson expanding mandrels actually get operations completed in less time than was formerly consumed in providing solid arbors. In cases this results in a tremendous cut in "down" time. Set of 14 Nicholson mandrels replaces 209 solid arbors. For all bores $\frac{1}{2}$ " to 7"; sold singly or in sets.



For details send for BULLETIN 750
136 Oregon St., Wilkes-Barre, Pa.

W. H.

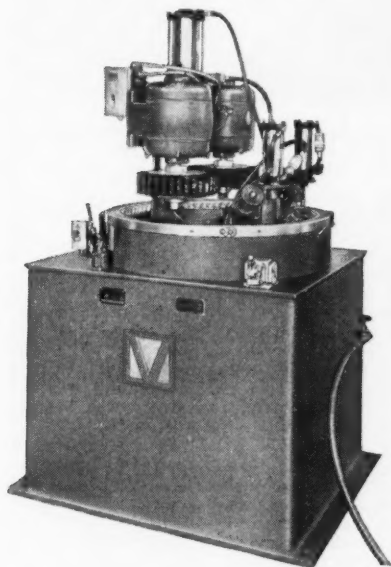
NICHOLSON

& CO.

TRAPS · VALVES · FLOATS

Machine Deburrs Compressor Stator Rings, Half Rings, or Other Jet Turbine Ring Sections

Designated as the TT-261, a turntable-type deburring machine which is designed for the rapid deburring of compressor stator rings, half rings, or other ring sections of jet turbines has been developed by Grinding & Polishing Machinery Corp., 2430-G Winthrop Ave., Indianapolis 5, Indiana.



Model TT-261 Turntable-Type Deburring Machine

According to the manufacturer, provision is made for holding ring sections to very accurate diameter during the deburring operation by interchangeable holding fixtures for different diameters of workpieces. Modifications of this design, it is claimed, can be readily adapted for deburring other circular workpieces.

The Model TT-261 Turntable-Type Deburring Machine is said to have a complete operating time cycle of one minute for loading, deburring, and unloading a pair of 32-inch diameter aluminum jet turbine half rings.

Cut accidents — Increase man hour production with a

Handles heavy dies from storage rack to press. Lifts barrels, boxes, loads trucks, makes a handy adjustable shop table. Automatic brake holds load at any height.

Type D — Hand operated
CAP. 500 lbs.....\$183.60

Type DE — Electric operated
CAP. 500 lbs.....\$412.08

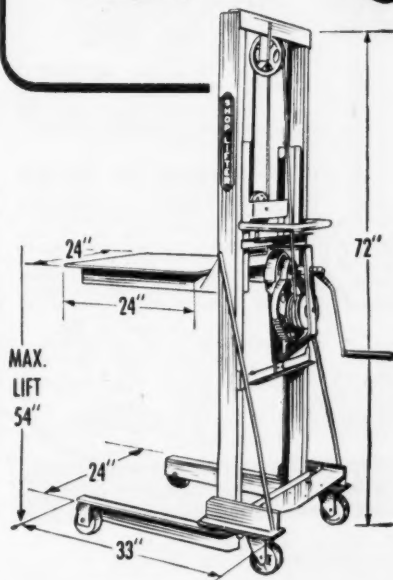
Type DX — Hand operated
CAP. 1000 lbs.....\$349.52

Type DX — Hand operated
CAP. 2000 lbs.....\$417.52

Floor lock included.
Prices net F.O.B. Chicago

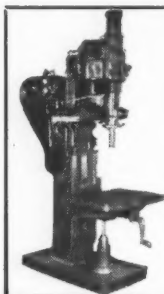
**ECONOMY
ENGINEERING COMPANY**
4507 West Lake Street
Chicago 24, Illinois

SHOP LIFTER



Machine Checks Diametrical Thread Elements Simply and Accurately

A floating-carriage diameter measuring machine which is designed to check all diametrical thread elements simply and accurately has been announced by The Sheffield Corp., Dayton 1, Ohio. The machine is available in three models with capacities up to 4 inches with 8 inches between centers, up to 7 inches with 12½ inches between centers, and from 6 to 12 inches with 14 inches between centers.



KAUFMAN TAPPING MACHINES

Kaufman specializes in tapping machines—every machine precision-built to meet the requirements of individual production jobs. Designed with fully automatic cycle, single or multiple spindle heads and other most advanced features. Write for complete information.

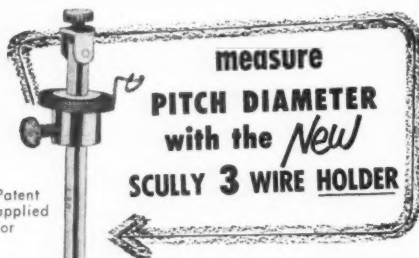
KAUFMAN MFG. CO.
Manitowec, Wisconsin



Sheffield Floating-Carriage Diameter Measuring Machine in use

The machine consists of a sturdy cast iron base which mounts two accurately-aligned and adjustable centers. At right angles to the axis of the centers is a freely moving measuring carriage mounted on balls in V-ways and carrying a micrometer and highly-sensitive reference-point indicator. The carriage is said to permit measurements to be taken along the center line and at right angles to the work. Repetitive checking of similar components, it is claimed, can be carried out rapidly and efficiently.

The micrometer unit has a large anti-glare matt chrome drum with clearly defined graduations, and a vernier scale enables direct readings to 0.00001 inch. Non-rotating anvils are fitted to the micrometer in order to minimize wear at the point of contact. Reference-point mechanical indicators are said to enable the thread elements to be measured to within 0.00001 inch irrespective of the "feel" of the micrometer. The indicators each



Patent applied for

NO LOST TIME FUMBLING WITH LOOSE WIRES

The Scully 3 Wire Holder features a coil spring securing the single thread wire. The spring allows the single thread wire to assume the Helix angle of the thread, and to maintain parallelism with the double wires. Each holder has accurately spaced slots for one American Standard pitch only: 32, 28, 27, 24, 20, 18, 16, 14, 13, 12, 11, 10 threads per inch.

ONLY
\$5.95
DIRECT



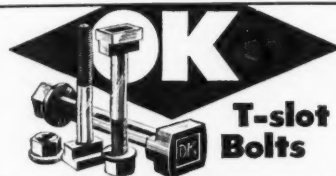
Order direct: individual holder \$5.95 — with wires for measurements within plus or minus .00015 — \$7.95. Set of 12 holders with Mounting Stand \$60.00 — with wires \$80.00.



SCULLY MACHINE COMPANY

40 WALTER STREET

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The world's best . . . one-piece, drop-forged—not welded—of mild carbon steel, heat-treated, with head accurately milled for standard tables on lathes, planers, boring mills, milling machines. Integral washer and nut. Sizes up to 30". Typical direct prices for 10" lengths: ½"—\$1.36; ¾"—\$1.34; 1"—\$1.58; 1½"—\$1.89. Write for price list.

THE O K TOOL COMPANY, MILFORD 4, NEW HAMPSHIRE

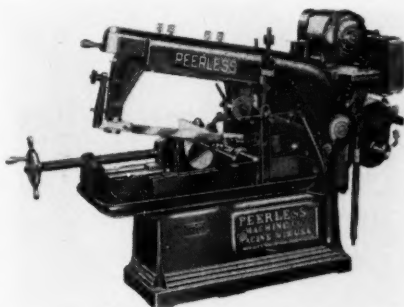
incorporate a fixed line and pointer giving a magnification of 350 to 1 on the movement of the micrometer anvil. All measurements are made against a known plain cylindrical standard.

Metal-Cutting Sawing Machine Features Open Saw Frame

Peerless Machine Co., 1600 Junction Ave., Racine, Wis., has announced a 10 x 10-inch Standard Model metal-cutting sawing machine to replace the 9 x 9-inch model formerly manufactured by the company. Designed for general purpose work, the new model is an overarm-type machine featuring an open saw frame to permit loading from the front or the side. The overarm is heavily constructed and carries and guides the saw frame. The machine incorporates a heavy U-type saw frame which, it is claimed, has wide shoulders to add rigid control of the saw blade, thus assuring sawing accuracy throughout the entire cut. The frame of the machine has hardened and ground steel bearing shoes which can be replaced instead of replacing the entire saw frame.

The table of the new model is said to provide a good working surface, and the

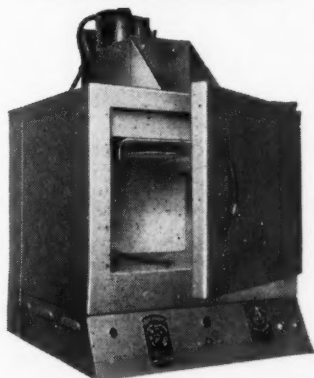
work-clamping vise is arranged to clamp work from 90 to 45 degrees. According to the manufacturer, the holding jaw can



Peerless 10 x 10-Inch Standard Model Metal-Cutting Sawing Machine

be quickly and easily set at the desired angle, and the clamping jaw adjusts itself automatically to the work. A centrifugal-force coolant pump is said to assure proper coolant flow at all times.

Automatic All-purpose Precision Heating



Write for literature covering our complete line or recommendations to meet unusual requirements.

HUPPERT MODEL 5700 SR Semi-Recirculating OVEN

Particularly suited for laboratory precipitation, ashing, general heating processes and for production tempering of tools and small parts. Temperatures up to 550° F. Thermostat accuracy 1% of scale range. Thoroughly insulated. Other features include: Adjustable vents, special insulation, explosion-proof latches, diffuser plate and siracco fan, heavy duty motor and two (2) heavy expanded, baked aluminum finished shelves. I.D. 20" wide x 12" high x 19" deep. 110 volt AC or 220 single phase.

MODEL	WATTS	TEMPERATURE RANGE	PRICE
5700 SRL	1400	80 to 350° F. (26 to 180° C.)	\$280.00
5700 SRM	1800	80 to 400° F. (26 to 204° C.)	\$280.00
5700 SRH	2800	80 to 550° F. (26 to 288° C.)	\$280.00

Other sizes and temperature ranges can be built to specifications. Also available with stainless steel inner housing, or all stainless steel construction - extra

1 Hour Timer \$10.00 extra

20 Hour Timer \$17.50 extra

K. H. HUPPERT CO.
6841 Cottage Grove Ave., Chicago 37, Ill.
Manufacturers of Electric Furnaces and Ovens



GIVES YOU EXCLUSIVE ADVANTAGES IN CUTTING OFF STOCK FAST AND ACCURATELY

Fast, burrless cut-off of shapes and tubes up to 30" round. Let M & M Triple-Chip saw blades give you the higher production-with-accuracy which Industry must attain and maintain. Ask your dealer.

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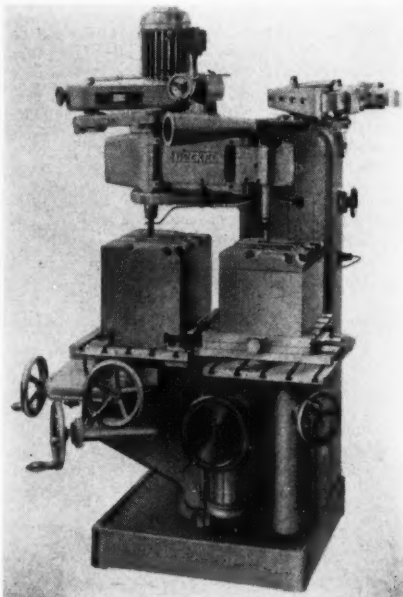


REMEMBER — IT'S THE COST
PER CUT THAT COUNTS!

Only
M & M builds
ALL 3:
CIRCULAR SAW
SAW BLADE
BLADE GRINDERS

Universal Pantograph Diesinking Machine Performs Wide Range of Copy Milling Operations

Cosa Corp., 406 Lexington Ave., New York 17, N. Y., has introduced the Deckel Model KF12 Universal Pantograph Diesinking Machine which is said to be capable of performing an unusually wide range of copy milling operations from diesinking of large and intricately-shaped dies and molds to light engraving. Dies and molds are said to be accurately



Deckel Model KF12 Universal Pantograph Diesinking Machine

reproduced with high surface finish. The pantograph system, it is claimed, permits two or three-dimensional milling at 1:1 ratio and reductions or enlargements from 1:1.5 to 1:4.

In a single setup, the cutting tool will cover an area of 15 $\frac{1}{4}$ x 15 $\frac{1}{4}$ inches or 10 x 19 $\frac{1}{4}$ inches. According to the manufacturer, the cutting areas can be utilized to their fullest extent even with die blocks up to 15 $\frac{1}{4}$ inches in height. A power-operated vertical saddle is said to permit both the master and workpiece to be raised or lowered simultaneously at a

rate of 30 inches per minute. A rough milling spindle with a built-in speed reducer is designed to hold collets for chucking tools with No. 2 Morse taper or straight shanks up to $\frac{3}{4}$ -inch diameter. A 1.5-h.p. spindle motor, it is claimed, assures positive non-slip spindle operations, and infinitely variable spindle speeds ranging from 60 to 10,000 r.p.m. are obtainable. A circular forming attachment, which is easily mounted on the toolslide, is said to allow circular forming operations in both vertical and horizontal planes and on inclined surfaces.

Improved Key-Type Pneumatic Cylinder Incorporates Unitized Cartridge Rod Bearing

Carter Controls, Inc., 2800 Bernice Rd., Lansing, Ill., has announced the development of an improved key-type pneumatic cylinder which incorporates a unitized cartridge rod bearing designed to aid in servicing and reducing wear caused by misalignment. Included in the cartridge unit are a long bronze rod-end bearing, rod packing, and self-centering packing at the pivot point. The cartridge, it is claimed, can be replaced without disas-

GET EXCLUSIVE ADVANTAGES

in the Cutting Off of
Small Stock and Shapes
with the No. 00

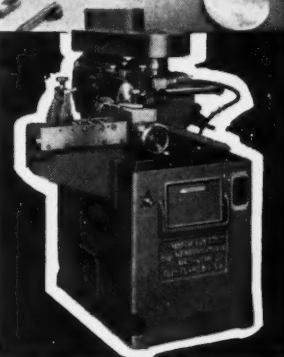
MOTCH &

MERRYWEATHER

**CIRCULAR SAWING
MACHINE, Employing**

the

**Triple-
Chip
METHOD**



Shown—No. 00-A, automatic.

For any ferrous or non-ferrous metal, titanium to magnesium. Square, burrless ends accurate to length with the Triple-Chip method. Available in automatic or manual stock feed. Capacity—up to 3" dia. tubes or shapes. Get full details.

THE MOTCH & MERRYWEATHER MACHINERY CO.

715 PENTON BUILDING • CLEVELAND 13, OHIO

• PRODUCTION-WITH-ACCURACY MACHINES AND EQUIPMENT •

Investigate,
too, This Aid to
Production



**Make the Most
of These Distinct
Advantages**

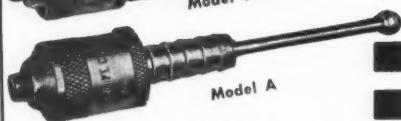
For the most favorable results, time- and profit-wise, use Motch & Merryweather's superb coolant. Anti-weld, averting pick-up. Sharper tools and longer-lived. Oily, but not "greasy". Smokeless, odorless. A real aid to money-making production.

Only
M & W builds
ALL 3:
CIRCULAR SAW
SAW GRINDER
PISTON GRINDER

Air-O-Chek
THE VALVE WITH
THE INTERNAL
FULCRUM LEVER



Model FA



Model A

For blowing chips
from work — For
cleaning out hollow
sets, machine recesses and tee slots—
For drying parts before inspection and
for many similar uses, Air-O-chek is
the Air-gun.

Write for details.

AIR-WAY PUMP & EQUIPMENT CO.

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AMERICA'S LARGEST MFG. OF ADVANCED BARREL
FINISHING EQUIPMENT, MATERIALS & COMPOUNDS
ALBERT LEA, MINNESOTA

sembly of the cylinder simply by remov-
ing a snap ring, pulling out the unitized
bearing, and dropping in a new cartridge.
Cast steel mounts are supplied as stand-



Carter Improved Key-Type Pneumatic Cylinder

ard equipment and are an integral unit
combined with the head and rod caps of
the cylinder. The head and mount com-
binations are said to be easily disassem-
bled by removing the internal locking
key ring which unites the head and cyl-
inder wall. The cylinder is available in
sizes from 1½ through 8-inch bores with
a stroke of any length up to 18 feet.

High-Speed Counterbores and Spot-Facers Have Interchange- able Pilots

High-speed counterbores and spot-fac-
ers with interchangeable pilots have been
added to the regular line of metal-cut-
ting tools manufactured by the Butter-
field Division of Union Twist Drill Co.,
Derby Line, Vt. Four styles of standard
counterbores and spot-facers are avail-
able; namely, Long and Short Set with
both straight and taper shanks. Two ad-
ditional styles are made especially for
the aircraft industry; namely, Long Set
and Short Set with ¼-inch shanks. The
Short Set style with ¼-inch shank is de-
signed for use with portable equipment,
such as hand drills.

To ensure rigidity and permanent align-
ment, all styles are made with the cut-
ter and shank integral and with the cut-
ting edges well backed. Pilots are care-
fully ground from high-grade alloy steel



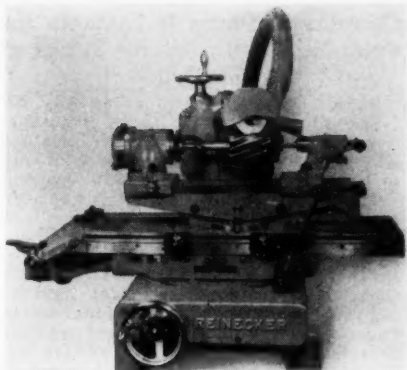
Butterfield Short-Set Aircraft-Style Counterbore
with ¼-inch shank

and are manufactured in two styles, one
for the standard counterbores and spot-
facers and the other for the aircraft styles.

Machine Grinds Taper Tools Between Aligned Centers

Kurt Orban Co., Inc., 205 E. 42nd St., New York 17, N. Y., has announced the Reinecker Model WZS Universal Tool and Cutter Grinder which incorporates a work table that can be tilted horizontally or vertically through 10 degrees, thus permitting the face grinding of taper tools between aligned centers. A spiral grinding fixture is said to permit accurate grinding of helical cutting edges, even with steep pitches, on both straight and tapered tools. Helical pitch is generated by longitudinal movement of the table by hand without the use of a cutting-tooth support. Two crossing guides and a system of rollers are employed.

The lower table swivels through 45 degrees in each direction, and tool faces, it is claimed, can be ground up to a 50-degree helix pitch. A hand-operated dividing head is provided for three-dimensional settings. A wheel dressing device, which is said to be suitable for dressing both dish and cup wheels, is adjustable so that the line of cone circumference is always in the theoretical grinding plane. The work spindle has a No. 4 Morse taper to accommodate mandrels, tapered sleeves, or collets, and the work table is



Reinecker Model WZS Universal Tool and Cutter Grinder

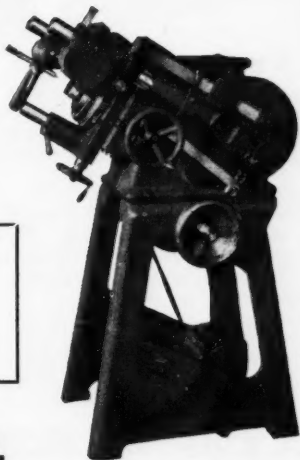
mounted on anti-friction bearings for easy movement. The grinding head can be tilted 10 degrees up or down for ease in adjusting clearance angle of cutting edge. According to the manufacturer, the Model WZS is adaptable to the production or sharpening of hobs, drills, reamers, milling cutters, and other tools.

Punches Shaped from the SOLID with OTTMANN Punch Shaper



FEATURES:

1. No holder plates required.
2. Simple work mounting.
3. No re-setting — Work can be adjusted to any position of tool.
4. Forms shaped accurate. Parallel and true.
5. Minimum hand work.
6. Convenient, simple operation. Uses standard shaping tools.



Write for Literature

CEDAR-WEST TOOL CO., INC.

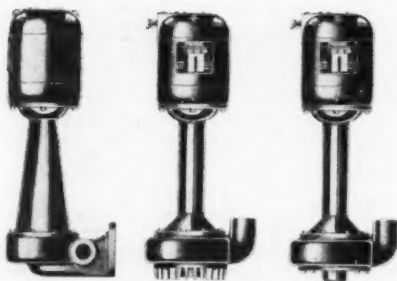
90 WEST ST.

NEW YORK 6, N. Y.

Centrifugal Pump Is Suitable for Pumping Practically All Types of Liquids

Suitable for pumping practically all types of liquids not too viscous or too corrosive for modern corrosion resistant alloys, a centrifugal pump which is said to be adaptable to both continuous and intermittent pumping operations has been announced by Pioneer Pump, Division of Detroit Harvester Co., 19657 John R St., Detroit 3, Mich. Available in three models designated as the VBH, VD, and VE, the pump is designed so that increasing the effective head proportionately reduces power demand. To avoid possible overload in the event of a sudden decrease in operating head, each pump is powered for the lowest possible head attainable with the discharge fully open.

According to the manufacturer, each model is a seal-less type pump and has no pump bearings, seals, or other moving metal-to-metal parts to wear. Each model is available in sizes ranging from 1/20 to 5 h.p., with several different port styles and mounting brackets. Larger sizes are rated at up to 148 g.p.m. at free flow and 9 g.p.m. at 124.7 feet of head (54 p.s.i.) based on water at 60 deg. F. The Model



Pioneer Models VBH, VD, and VE Centrifugal Pumps

VBH is designed for mounting on the outside of a tank or machine pedestal and is available with a right or left-hand discharge outlet or with a special outlet back through the center of the intake port. The Model VD is a submerged type pump which will intake through a grille at the bottom. A reversible flange mount for attaching the pump to either the top or bottom surface of the tank cover enables the cover and the pump to be removed together. This model is also avail-



waiting for you

Gone are the days when you had to wait for delivery on most punches and dies while they were made to order. *Now they wait for you.*

You can order for *immediate shipment from our stock*, 76 styles of punches and 65 styles of dies in round, flat, oval, and square sizes to fit most makes of presses.

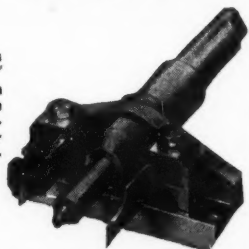
Besides this saving of time, *you save money.* Send for our catalog sheets and check the lists of immediately available sizes and their prices.

T. W. LEWTHWAITE MACHINE CO.

317 East 47th St., New York 17, N. Y.

Cut Costs on Hole-Cutting! USE THE NEW . . . BOREMASTER

Finished holes
1 1/2" to 11 3/4"
diameter to a
depth of 8" in
one rapid operation on your
present equipment!



BOREMASTER is not just another Trepanning Cutter, but a real heavy duty tool. Stock is removed in one piece eliminating waste. Remember . . .

TIME SAVINGS + MATERIAL SAVINGS
= COST SAVINGS

• Write us today for complete details!

KARL A. NEISE

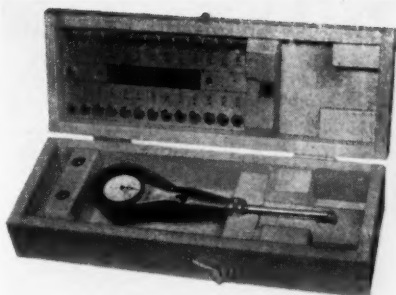
Master tools for Modernized Machining
381 4th Ave., Dept. MMS, New York 16, N. Y.

able with vertical and horizontal surface brackets for mounting the pump on the tank side, tank edge, or directly on machine faces. The Model VE is designed for external mounting with vertical or horizontal surface brackets similar to the Model VD. Intake is through a pipe-tapped boss in the center of the bottom cover of the pump. Each model is said to be particularly suited for handling liquids that are highly polluted with abrasives, chips, and other entrained solids.

Dial Bore Gage Is Available with Set of Centering-Size Discs

Previously offered as a single-hole gage with a centering-size disc for checking one dimension, the No. 00 Dial Bore Gage, manufactured by Standard Gage Co., Inc., Poughkeepsie, N. Y., is now available with a complete set of extensions covering any dimension from $\frac{1}{4}$ to $\frac{3}{4}$ inch. The set consists of 27 centering-size discs mounted on a rectangular plate with the size of each disc plainly marked. The discs are said to be interchangeable on the gage head and lock positively into position by the action of a clamping nut.

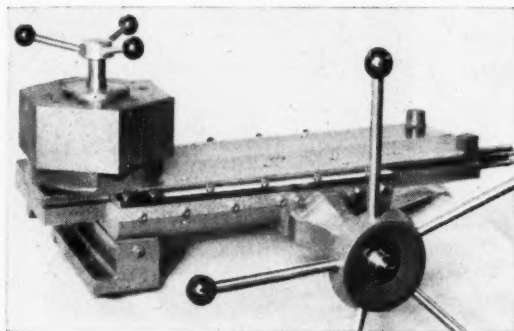
The gage features sapphire-tipped gag-



Complete Standard No. 00 Dial Bore Gage and Centering-Size Disc Set

ing plungers and a hard, chrome-plated disc surface. According to the manufacturer, the gage will cover a total tolerance of 0.005 inch and is capable of checking to within $\frac{1}{16}$ inch from the bottom of a blind hole. The manufacturer also points out that the set of discs is offered as optional equipment and that the gage is still available with a single disc suitable to the user's specified dimension and tolerance.

LYNN TURRET SERIES F-BT3 — for Lathe Swing 15"-to-26"



Head 9½"
Tool Hole 1½" to 2"
Working Travel 10½"
Over-all Length 35"
Swings 6" Box Tools
Weight 470 lbs.

Self-Indexing for Fast Production
Easily Adjustable for Alignment
and Wear

Less Experience Needed to Operate

Only manufacturer of conversion turrets.

Turrets available for smaller Lathes

WRITE, OR PHONE ATLANTIC 7267

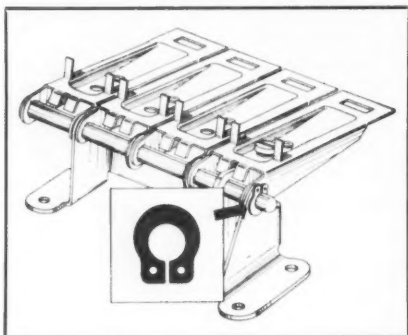
LYNN MANUFACTURING CO.

1121 SOUTH SEVENTH ST.

MINNEAPOLIS, MINN.

Retaining Ring Provides Positive Shoulder on Small Shafts

A fastener which is said to provide a positive shoulder, secure against thrust



Line drawing of Waldes-Kohinoor Series 5555 Truarc Grip Ring used in taking up end play

and vibration, has been added to the Truarc line of retaining rings by Waldes-Kohinoor, Inc., 47-16 Austel Place, Long Island City 1, N. Y. Designated as the

Series 5555 Truarc Grip Ring, the retainer can be assembled and disassembled in either direction on a straight, ungrooved shaft with Truarc pliers. According to the manufacturer, the basic design principle of complete circularity around the periphery of the shaft and the ring's unusually large radial width combine to exert considerable frictional hold against axial displacement.

The grip ring, it is claimed, can be used effectively as a means of taking up end play by simply installing it tightly against the machine part as shown in the accompanying illustration.

Diamond Wheels and Hones Are Bonded by Special Method

Designated as "Star Dust," a line of diamond wheels and hones which is said to be carefully and scientifically graded has been announced by Ace Abrasive Laboratories, 250 W. 57th St., New York 19, N. Y. According to the manufacturer, the wheels are bonded by a special method which provides maximum efficiency. The bond, it is claimed, is hard enough to hold the abrasive properly, yet dissipates at a rate calculated to keep the abrasive surface even at all times.

COMET

BORING, FACING, and INTERNAL THREADING TOOLS

For holes from 1/8" upward, 15 different sizes

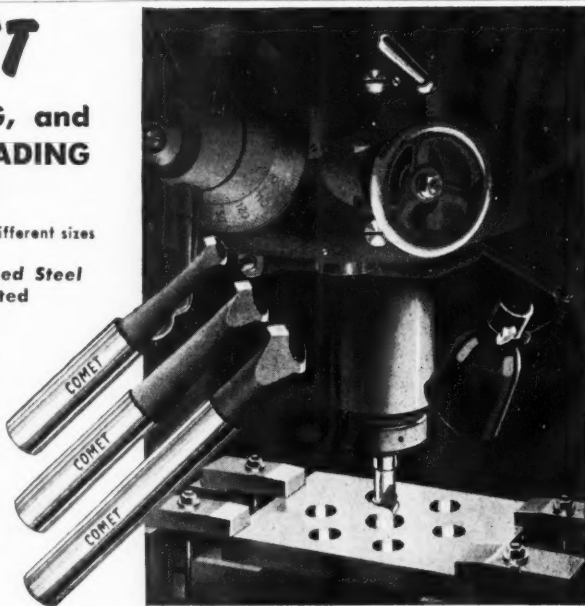
**Made of Super-High-Speed Steel
Specially Heat Treated**

Indispensable for your JIG BORER. The worm-like spiral of the boring heads provides a long useful cutting surface. Their use insures perfect fitting threads. Correctly designed for precision work.

Write for complete data.

Comet Tool Co.

738 Broadway
New York 3, N. Y.





Ace "Star Dust" Diamond Wheels

Star Dust Diamond Wheels and Hones are available in a wide variety of types and sizes.

Bench Rack Designed for Diamond Compound Applicator

A bench rack for the convenient and efficient use of Hyprez Diamond Compound Applicator Guns has been designed by Engis Equipment Co., 431 S. Dearborn St., Chicago 5, Ill. The stand, it is claimed, will accommodate four applicator guns of any size (5-gram, 9-gram, or 18-gram), providing clearance for the special Hyprez reduction needle, grooves for lapping sticks, a hook for fluid atomizer, and adequate shelf space for bobs, jars, and so on.

The rack is rigidly constructed of maple with dowelled joints, and finished in machine-tool gray.

Engis Bench Rack for Hyprez Diamond Compound Applicator Guns and supplies



IS THE
BOSS
IN?



You had better let the boss see this little fellow . . . he knows something . . . he knows how to make more holes per dollar invested . . . That's important, today. He's high quality . . . and designed to do a specific job. Wood & Spencer have gone as far as possible in experience and sound engineering, to produce a tap that all but talks. With a machine operator's craftsmanship and a tap with a Wood & Spencer diploma, you have a combination that will make any cost-minded production man "Tap-Happy."

THE RIGHT TAP AT THE RIGHT TIME

The Wood & Spencer Company
Cleveland 3, Ohio

Thread-Cutting Broach Is Designed for Use in High-Speed Steel

A special high-speed steel thread broach for tapping highly heat-treated steel parts of various alloys, including chromemoly alloys and stainless steel, has been developed by Shearcut Tool Co., 7045 Darby Ave., Reseda, Calif. According to the manufacturer, the broach provides a shear-cutting action which does not tear the threads, and the chip comes out of the hole in one continuous piece. The tool, it is claimed, can be easily resharpened on a tool and cutter grinder by sim-

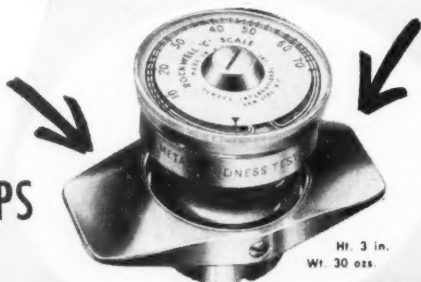


Shearcut Special High-Speed Steel Thread Broach

ply following a finger and rotating the tool as the table of the grinding machine is moved.

The special broach is available in all standard sizes from No. 4 to No. 12 machine screw size, and from 1/4 to 1 1/2 inches in fractional sizes, in both National Coarse and National Fine pitches. Special sizes can be furnished to meet user requirements.

**JUST
PRESS
HANDGRIPS
TO**



**TEST HARDNESS OF ANY SIZE,
SHAPE, TYPE METAL...**

**DIRECT DIAL READINGS
ACCURACY GUARANTEED BY INDIVIDUAL CALIBRATION**

- AVAILABLE IN:**
- Rockwell "A" Range 35-75 Scale
 - Rockwell "B" Range 5-100 Scale
 - Rockwell "C" Range 6-70 Scale
 - Rockwell "15N" Range 70-95 Scale
 - Brinell Medium Range 100-440 Scale
 - Brinell Low Range 50-260 Scale

Write today for Booklet ET 431 or demonstration in your shop.

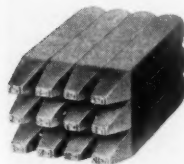
NEWAGE INTERNATIONAL
ERNST PATENT
portable metal hardness testers

MADE IN U.S.A.

NEWAGE INTERNATIONAL, INC., 235 E. 42 ST., NEW YORK, N.Y.
NEWAGE (CANADA) LTD., 1174 BAY STREET, TORONTO

Steel Stamp Set

Steel stamps which are designed to mark tools, assemblies, parts, and so on, clearly with the date of



Parker Steel Date Stamp Set

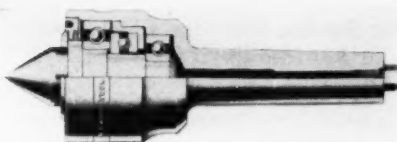
manufacture have been introduced by Parker Stamp Works, Inc., 650 Franklin Ave., Hartford, Conn. The stamps are supplied in sets which consist of 12 individual stamps, each bearing a key letter which changes annually and a number to indicate the

month. Each stamp is made with deep-cut letters to provide sharp, lasting impressions with a minimum of blow. Sets are available in $\frac{1}{8}$, $\frac{1}{4}$, and $\frac{3}{8}$ -inch character sizes. Other sizes can be supplied on special order to meet individual requirements.

Center Is Designed for Heavy Thrust Loads on Spinning Applications

Designated as the Red-E spinning center which is primarily designed to accommodate high speeds and heavy thrust loads has been announced by Ready Tool Co., 540 Iranistan Ave., Bridgeport 5, Conn. The center utilizes two radial anti-friction bearings, spaced accurately to provide maximum rigidity with minimum deflection. The center incorporates a ball thrust bearing between the two radial bearings to assure maximum thrust loads while in operation and is said to operate at excessive speeds without heating up, even when unusual pressure is applied. According to the manufacturer, the center is designed to revolve at better than 10,000 r.p.m. without damage to the center parts or its accuracy.

The shell is of one-piece high-alloy steel construction, embodying a lube cup for the special bearing oil. The spindle is locked in the bearing assembly. The point is made of high-speed steel for maximum abrasion wear and



Red-E Ultra High-Speed Spinning Center

is ground after assembly of the bearings. A labyrinth enclosure is said to prevent the entering of cutting chips and the escape of lubricant.

NOW! JIFFY  TIRES



STANDARD EQUIPMENT ON

**DELTA
CRESCENT
BAND SAWS**



Proof of Acceptance . . .

Delta-Crescent has joined the ranks of leading band saw manufacturers using CARTER Jiffy Tires as standard equipment because . . .

- Jiffy Tires can be changed in 10 minutes
- Provide 2 to 4 times more wear
- Provide perfect traction
- Jiffy Tires are safe . . . won't throw at any speed

● **WRITE FOR CATALOG**

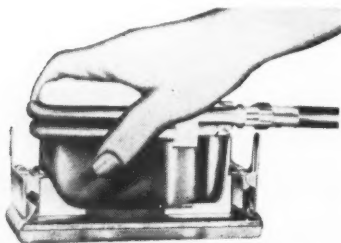
Delta Crescent
20" Band Saw

CARTER PRODUCTS COMPANY, INC.

426 Wm. Alden Smith Bldg. 30 Ionia Ave., S. W.
Grand Rapids 2, Michigan

Air Sander Provides 4,500 Strokes Per Minute of Operation

Designated as the Model J-R, a small, light, reciprocating air-powered finisher, marketed under the trade name "Easy,"



Detroit "Easy" Model J-R Finisher

which is capable of producing 4,500 strokes per minute of operation on air pressures of from 50 to 60 lb. has been announced by Detroit Surfacing Machine Co., 1333 E. Eight Mile Rd., Detroit 20, Mich. The sander weighs 4 lb. and has a small palm-size grip for maximum oper-

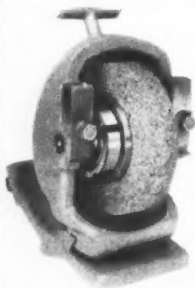
ator comfort. The unit incorporates an air switch-type control, no-surge automatic mist-type water spray for wet sanding, and an easy-to-use abrasive holder for attaching several sheets of sand paper at one loading.

According to the manufacturer, a unique slide action design for attaching the detachable sanding pads allows for up to a 2-inch off-center adjustment of the pad. The off-center pad position is said to permit sanding in grooves, up to protruding trim, and other hard-to-get-at areas.

Machine Tests Spur Gears

George Scherr Co., Inc., 198-A Lafayette St., New York 12, N. Y., has announced a spur gear tester which features a sturdy flame-hardened meehanite base for stability and rigidity. A floating hand rests on precision steel balls for maximum sensitivity and contacts a dial gage which provides readings in 0.0005-inch increments. The slide is held against the gage by means of a spring which is adjustable to the desired pressure. For measuring center distance, a rustproof scale and vernier is furnished, providing

Precision WHEEL DRESSING TOOL



Precision Model L 10-89 A Truing Tool using especially designed abrasive wheel offers greatest economy and lasting finish in its method of dressing diamond and grinding wheels. All movable parts are made of special steel hardened and ground. Shaft is mounted with Double Row Ball Bearings having special tolerance for high rate of speed. Enclosed wheel ten-

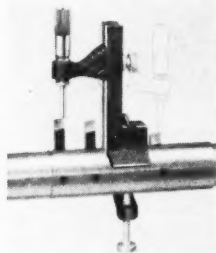
sion mechanism eliminates end play. Easily mounted on any Norton Cylindrical Grinder having C Type Table. Write for details.

THE PRECISION TRUING TOOL & MFG. CO., INC.

13 EAST 16TH STREET COVINGTON, KY.

SAVE TIME

With
Bartelt
Gages



• Use a Bartelt Pedestal Micrometer for setting boring tools and for many other shop operations requiring accurate positioning relative to a fixed base. Make settings in one step — eliminate cut-and-try methods. Model B, with reversible slide, shown. Write for literature describing all models.

BARTELT ENGINEERING CO.

1216 PARTRIDGE AVE.

BELOIT

WISCONSIN

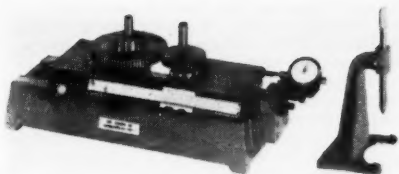


Illustration showing Scherr Spur Gear Tester together with vertical center support furnished as standard equipment

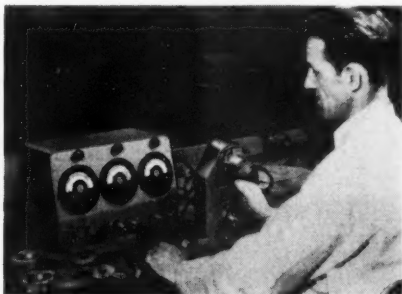
readings in 0.001-inch increments. The scale has a Lustro-Chrome finish which is said to provide for quick and easy visibility. The slides are drilled and tapped for the mounting of vertical center supports for the inspection of pinion gears, one support being furnished as standard equipment.

The gears to be tested are placed on fixed arbors or studs. The readings are obtained on the dial. By spinning the two gears, the inspector, it is claimed, can quickly determine the running quality of the gears. According to the manufacturer, the instrument will reveal errors in center distance, eccentricity, and spacing; the presence of burrs; and the estimated amount of gear backlash.

Computing Air Gage Indicator Figures As It Measures

For measuring problems that involve determining two variable dimensions and then combining them into a laborious calculation, The Taft-Peirce Mfg. Co., Woonsocket, R. I., has announced the

Illustration showing three Taft-Peirce Computing CompAIRators being used for checking the center distance, bend, and twist of a connecting rod



VIMCO Lights



Walsh Press & Die Co. installs Vimco model No. 347 heavy duty light on their Walsh 12, Hi Speed Punch Press.

Vimcolight cuts down shadows, increases accuracy and creates safer working conditions. You get increased production, too, because operator fatigue is reduced.

Install Vimcolights as original equipment. Put the "Vim" in your machines' performance with Vimcolights.

Write for further information on Model No. 347.

SEE BETTER!

WORK BETTER!

VIMCO MFG. CO., Inc.

SINCE 1919

111 BRAYTON ST. BUFFALO 13, N. Y.

Taft-Peirce Computing CompAIRator, the use of which makes it possible to remove the effect of one of the variables (diameter) on the results shown by the indicator for value of angle of taper, concentricity, and clearance by applying the diameter variation to both sides of the differential measuring device, thereby nullifying its effect on the reading obtained on the dial. In this way, readings for these dimensional characteristics can be obtained on a single dial with a single pointer, thus providing for fast, accurate, and convenient readings, it is claimed.

According to the manufacturer, typical

applications for the Taft-Peirce Computing CompAIRator include determining deviation from desired degree or angle; determining center distance without respect to hole size; determining parallelism or angularity of shafts or bores; and many other applications.

Portable Welder Is Designed to Butt-Weld Band Saw Blades

Compact and fully automatic, a large-capacity portable band saw blade welder which is designed to butt-weld blades from $\frac{1}{16}$ to $\frac{3}{4}$ inch, as well as capable of

handling a wide range of work from intricate internal tool and die to power cut-off saws, has been an-



**You'll Get Better Service from
OBI PRESSES
with WELDED
STEEL
FRAMES**

Less deflection under load means less wear on dies, and cleaner, more accurate work. Clearing's welded steel frames assure maximum rigidity. Extra long guides hold slide firmly even at bottom of stroke. Send for bulletin.

CLEARING MACHINE CORPORATION

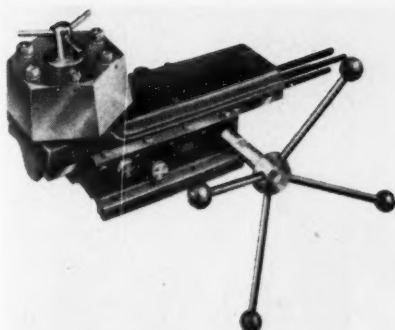
6493 WEST 65TH STREET • CHICAGO 38, ILLINOIS



Brennen Portable
Band Saw Blade
Welder

nounced by Brennen Mfg. Co., 676 59th St., Brooklyn 20, N. Y. The welder incorporates a built-in grinder, which is designed to remove flash from the weld, and a double gage for checking thickness of weld on flat saws. The welding jaws are constructed of solid copper, and the unit is housed in a welded-steel case with a gray-wrinkle finish.

Overall dimensions of the unit are $7\frac{3}{4}$ x 12 x 7 inches. Supplied with a handle for easy portability, the welder operates on 110-volt 60-cycle a.c. and is furnished with an 8-foot cord and plug. A removable back plate is said to facilitate permanent installation when desired.



Self-Indexing Bed Turret Features Tilting Head

Designated as the Newton "Tilt-Head," a self-indexing bed turret which is said to be capable of swinging tools as large as 6 inches in diameter over the ram and which also provides a working travel of $7\frac{3}{4}$ inches has been announced by A. K. Tool Co., 2029 Blake Ave., Los Angeles 39, Calif. The turret has ground bearing surfaces on the slide and bed, and repeating accuracy is said to be assured by a tapered locating pin which operates in a sleeve bearing and locates in a mating seat. All parts of the turret are made of heat-treated tool steel, ground and honed.

Through a clutch arrangement, index-

Newton "Tilt-Head" Self-Indexing Bed Turret

ing can be either manual or automatic as the operator desires. For extra-heavy cuts where extreme rigidity is required, the ram lock and head lock, it is claimed, provide stability. The turret is designed for use on most 10, 11, and 12-inch lathes.

Victor's Specials Deserve Your Attention!

EXTRA L-O-N-G LENGTH



Taper Shank

**HIGH SPEED
DRILLS**

IMMEDIATE

DELIVERY

12" CUTTING FLUTE, 16" OVERALL

Size	Net	Size	Net	Size	Net
33/64 ...	\$ 7.50	41/64 ...	\$ 9.00	25/32 ...	\$10.20
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15" CUTTING FLUTE, 20" OVERALL

1 ...	\$18.00	1-1/8 ...	\$22.50	1-1/4 ...	\$25.00
1-1/16 ...	20.00	1-3/16 ...	24.00		



VICTOR MACHINERY EXCHANGE, INC.

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GROBET CHATTERLESS COUNTERSINKS

Six staggered cutting edges give shearing cut that eliminates all chatter.

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421 Canal Street N. Y. 13, N. Y.

**EASY-CUTTING
EKSTROM, CARLSON**



SPIRAL-FLUTE

ROUTER BITS

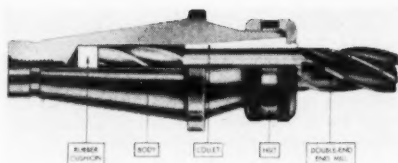


- STRAIGHT OR INVERTED-TAPER SHANKS
- SINGLE OR DOUBLE FLUTE
- SINGLE OR DOUBLE END
- UP-CUT OR DOWN-CUT SPIRAL
- AVAILABLE IN ANY SIZE, TYPE, OR QUANTITY

Write for Literature

EKSTROM, CARLSON & CO.
1400 Railroad Ave., Dept. M-14
ROCKFORD, ILLINOIS

MANUFACTURERS OF AIRCRAFT PRODUCTION MACHINERY



B & V Collet Chuck

Collet Chuck Is Available with Capacities from 1/8 to 2 Inches

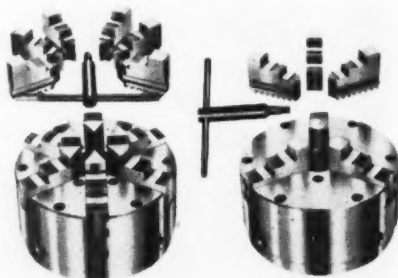
Designated as the B & V, a collet chuck which is available in 48 models with capacities from 1/8 to 2 inches for use in milling machines, boring mills, drilling, centering, or grinding machines, lathes, and automatic screw machines is now being marketed by Victor Machinery Exchange, Inc., 251-B Centre St., New York 13, N. Y. The chuck utilizes a single taper collet with a flat contact surface against the nut, thus holding along the entire length. Available with a Morse, Brown & Sharpe, milling machine taper, or straight shank, the chuck is said to have a small overhang, and maximum runout is 0.0004 inch.

The front part of the collet is shaped into a flange, the diameter of which is somewhat greater than the inside diameter at the front end of the nut. The collet, it is claimed, can easily be forced over the nut flange, thus maintaining a safe connection between collet and nut.

Chuck Is Available with Three or Six Internal or External Jaws

Buck Tool Co., 314 Schippers Lane, Kalamazoo, Mich., has announced the

Buck "Ajust-Tru" 9-Inch Chucks with six and three internal and external jaws



addition of a 9-inch chuck to its line of "Adjust-Tru" chucks. The 9-inch chuck is available with three or six internal and external jaws and is said to be capable of holding workpieces up to 8 inches in diameter. According to the manufacturer, the chuck assures a tolerance of 0.0005 inch within one minute on original chucking, and has universal scroll-chuck re-chucking speed on duplicate work. Teeth are generated on the pinion and bevel gear portion of the scroll to provide smooth operation.

Universal Grinding Wheel Dresser

Designated as the Model No. 6, a grinding wheel dresser which can be bolted down for cutter and cylindrical grinders or which can be used on a magnetic chuck for surface grinders has been announced by L. Newman, 1001 24th St., Oakland 7, Calif. The shaft of the dresser can be tilted all the way forward or backward and the dresser wheel unit can be adjusted up or down or made to swivel on the shaft depending upon the angle desired for the dressing or truing operations.



Newman Model No. 6 Grinding Wheel Dresser

According to the manufacturer, the Model No. 6 can be used as a diamond wheel dresser with Newman N-D1-46 or N-D2-46 wheels. All Newman replacement wheels are interchangeable on all dresser models.

When so much depends on so little



Don't settle for less than Chicago "Safety Plus" High Carbon Heat Treated Cap Screws

- For complete hardness from the center all the way out — no soft skin to cause wear or breakage due to fatigue.
- For freedom from scale — cleaner to handle — give a tighter thread fit — have smoother bodies.
- For extra safety — better appearance — All at no increase in cost to you.

Your Service-Conscious Industrial Supply Distributor carries a complete stock of our products. Ask him for samples of Chicago "Safety Plus" Heat Treated Cap Screws. His familiarity with your local field conditions enables him to fill your supply needs promptly and correctly. Ask for "Chicago" and get "Safety Plus".



Chicago SCREW COMPANY
2505 W. WASHINGTON BLVD. • BELLWOOD, ILL.

When you use Chicago "Safety Plus" Heat Treated Cap Screws, this is what you get:

Extra Hardness here keeps corners sharp, prevents wrench slipping on head.

Extra Hardness here gives more wearing surface on body.

Extra Hardness here reduces nicks, gives tighter fit, less wear on threads.



Machine Provides Chilling Capacity Down to Minus 140 Deg. F.

Designated as the Model T-120, a machine which is designed to provide a chilling capacity down to a minus 140 deg. F. for moderate scale production operations has been announced by Sub-Zero Products Co., 3930-S3 Reading Rd., Cincinnati 29, Ohio. According to the manufacturer, the unit has a thermal capacity of 1,200 B.T.U. per hour at a minus 120 deg. F. and a chilling chamber capacity of approximately 7.5 cubic feet. The machine features an all-steel cabinet and heavy-gauge steel chilling chamber walls.

HOW TO SAVE TIME & MONEY in MACHINE SHOP TOOLING

FIFTY TOP MANUFACTURERS SUPPLY VALUABLE DATA

The MAN AT THE MACHINE needs quick, easy answers on materials, grinding wheels, angles, feeds. FIFTY TOP MANUFACTURERS give the data in "Machine Shop Tooling". ALL NEW IN CONCEPT — ALL NEW IN INFORMATION, this 300 page book works like a dictionary. Saves expensive time, saves costly materials — gives the right answers in a flash!

FIRST PRACTICAL BOOK FOR MAN IN THE SHOP

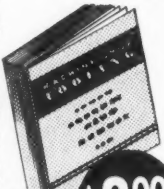
Now, for the first time, the man at the machine can have the lightning fast answer to select and prepare his tools—BY NAME. Now, he can be sure of the CORRECT TOOLING—the RIGHT LUBRICANT—the RIGHT speed for the RIGHT metal. Covers all tools used in the average shop and tool room. A gold mine of information!

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You will find this book so useful that we ABSOLUTELY GUARANTEE your satisfaction. Try MACHINE SHOP TOOLING for 10 days. If not completely satisfied—we will refund your money WITHOUT QUESTION. Only \$3 a copy. Send check, M.O., or cash or sent C.O.D. (You pay postage). Order your copy today!

EXACT DATA ON

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 - Grinding
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 - Milling
 - Drilling
 - Gears
 - Boring
 - Tapping
 - Lubricants
- and many others

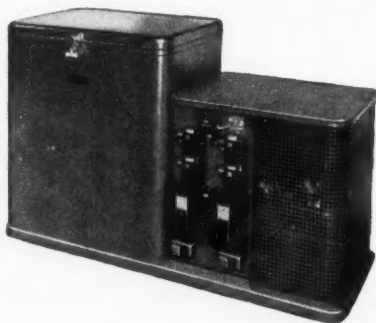


WILCO PRESS DEPT. X

3326 N. BAILEY ST., PHILA. 29, Pa.

\$3.00

The unit measures 72 x 27½ x 45 inches high overall and is provided with two motors, ½ and ¾ h.p., which are both



Sub-Zero Model T-120 Industrial Chilling Machine

hermetically sealed and easily accessible. Temperature, it is claimed, can be controlled from minus 70 to minus 140 deg. Fahrenheit.

Cutting Agent Is Designed for Machining and Grinding Operations

Designated as Metalloid WOS, a metal cutting agent which is designed for practically all machining and grinding operations and which is soluble in both water and oil has been announced by The Metalloid Corp., Huntington, Ind. The product, it is claimed, is an odorless, non-toxic, sulphur-free, solubilized organic condensate containing chlorine, nitrogen, oxygen, and carbon in a complex molecule. The material is said to be non-

HARDENED and GROUND HSS BLANKS

Any decimal diameter to 3/8" — in any length. Mirror finish surface to gage tolerance. Many uses — punches, gages, measuring wires, special tools, etc. Quick delivery.

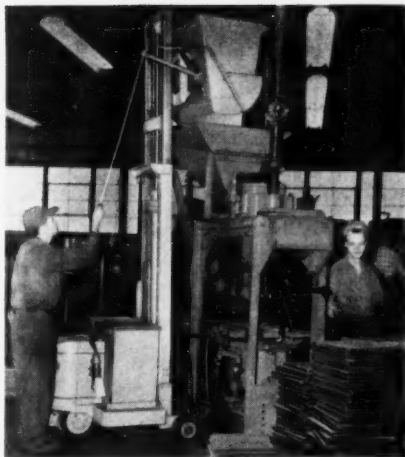
Write for price list D-2
WILLIAM T. HUTCHINSON COMPANY
235 Main St. Orange, N. J.

staining for ferrous and non-ferrous metals except some copper and brass alloys which will discolor slightly if the product is allowed to remain on the work for a period in excess of 12 hours. The fluid is claimed to be completely safe for use on silver and silver alloys.

According to the manufacturer, Metalloid WOS functions on a heat-limiting principle which holds the temperatures of the tool and workpiece well below the critical annealing temperatures. This is said to be accomplished by releasing free atoms at the point of cut, which unite with the active metal to cause embrittlement and reduce the plastic flow of the metal during the cutting operation.

Special Truck for Foundry Service

For moving sand between foundry machinery, Lift Trucks, Inc., 2429 Spring Grove Ave., Cincinnati 14, Ohio, has brought out a special truck, identified as the Hydroelectric, which is designed to operate in very limited areaways. The truck has a capacity of 1,000 lb. and a total lift of 120 inches. The unit is powered by a 12-volt battery with two motors, one for the lifting mechanism and



Hydroelectric Truck in use

the other for the drive wheels. All controls, including those for lifting and lowering the hopper, are located within the steering handle.



Notch

12 PIPE ENDS *per* MINUTE

Make Perfect Joints for Welding or Brazing

ARC-FIT

REG. U. S. PAT. OFF.

**NOTCHES CLEAN
NO FINISHING**

Standard ARC-FIT in hand or power press shears contours for "T" joints for 1/2" to 2" pipe or tubing with easily interchanged dies. Special ARC-FITS for larger sizes, angles other than 90°, slotting or notching square pipes, angle iron or flat stock.

VOGEL

TOOL & DIE CORPORATION

1823 N. 32nd AVE. • MELROSE PARK, ILL.



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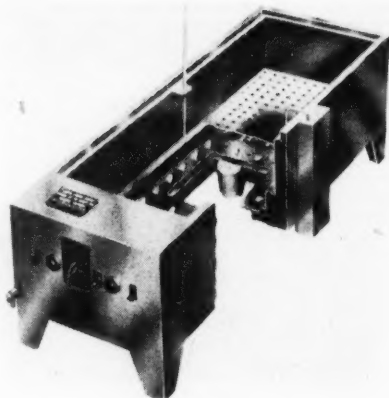
Standard Arc-Fit works well in our special HAND PRESS



Water Bath Unit Provides Complete, Gentle Agitation

Blue M Electric Co., 306-308 W. 69th St., Chicago 21, Ill., has announced the "Magni-Whirl" Utility Water Bath which is said to provide complete, gentle agitation in all areas of the liquid mass irrespective of how heavily the bath is loaded with test specimens. According to the manufacturer, this agitation is accomplished by means of an automatic self-timing electromagnet, below the bottom wall of the bath, which periodically pulls the flexible circulator plate up and down. The built-in automatic stirrer and circulating system, it is claimed, automatically maintains temperatures from ambient to 100 deg. C. throughout the entire water mass to within plus or minus $\frac{1}{4}$ deg. Centigrade.

The unit features a Blue M Automatic Dual Microtrol which selects and repeats the two most used temperatures. A power selector switch which automatically permits the selection of the proper wattage in relation to the desired temperatures is also incorporated in the unit. Tubular full-length heating elements are utilized.



Cutaway view of Blue M "Magni-Whirl" Utility Water Bath

The unit is available in four standard models with working spaces ranging from 12 inches long x $7\frac{1}{2}$ inches wide x $7\frac{1}{2}$ inches deep to 36 inches long x 18 inches wide x $9\frac{1}{2}$ inches deep.

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OPEN BACK INCLINABLE PUNCH PRESSES

Soundly Engineered — Ruggedly Built for
PRECISION & ECONOMY



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- All bearings honed to exact sizes, guaranteeing perfect fit and alignment.
- Matched unit slide and gibs pre-finished by precision lapping with newly developed process.
- Chrome molybdenum cranks, wrist pin connections.
- Easy to maintain — economical to operate.
- 5 to 70 tons capacity.
- 9 models.

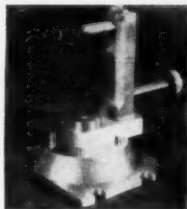
MARSHALLTOWN MFG. CO.
MARSHALLTOWN, IOWA

Wheel Dresser Provides for Quick and Accurate Tangent or Radius Dressing

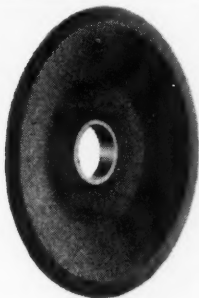
An improved Radix Wheel Dresser for quick and accurate tangent or radius dressing on any standard model surface or internal grinder with up to an 8-inch wheel has been announced by The Cleveland Radix Tool Co., 1025 Broadway, Cleveland, Ohio. The dresser is said to be capable of holding diamonds from $\frac{1}{16}$ to $\frac{1}{2}$ inch in diameter and of maintaining a 0.0001-inch radius tolerance. The

unit is ruggedly constructed of hardened, ground, and lapped tool steel.

For quick and easy setting of diamonds to any desired radius, the dresser is equipped with a master gage. The diamond holder, it is claimed, can be stop-



Radix Improved Wheel Dresser

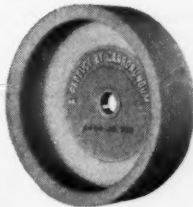
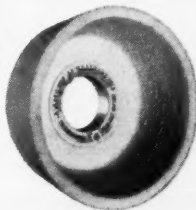


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Tool room grinding... Looking for ways to boost output and lower costs? Then get your *free* copy of "Maintenance of Alloy and High Speed Cutting Tools." Tells you "how to," helps you choose the *right* wheel for each job—from the complete line by CARBORUNDUM.

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He's your best bet for counsel on any grinding problem... for complete stocks... prompt delivery.

THE CARBORUNDUM CO., Dept. MM-81-35A
Niagara Falls, New York

YES! I'd like a copy of Booklet 10 on cutting tool maintenance.

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TRADE MARK

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"Carborundum" is a registered trademark of The Carborundum Company, Niagara Falls, N. Y.

ped at any radius point, with positive stops also provided for 90 and 180 degrees. The base of the dresser measures 4 x 5 inches, and the overall height of the unit is 5½ inches. The wheel dresser has a capacity for producing a 1¼-inch male or 2-inch female radius. A larger model of the dresser is available for wheels up to 16 inches.

Powdered-Solder Paste Cleans As It Tins When Applied to Metal Surfaces

Designated as "Hy-Tin," a paste containing powdered solder suspended in a powerful scavenger-action flux which, it is claimed, cleans as it tins in the same application has been announced by Farrelloy Co., 1235 N. 26th St., Philadelphia 21, Pa. The flux in the paste is said to be stable and non-active at normal temperature; however, at soldering temperature the flux turns liquid and removes scale and tin black iron. According to the manufacturer, there is no metal and flux separation to require constant mixing before application and there is no

sputtering when the mixture is applied to heated metal.

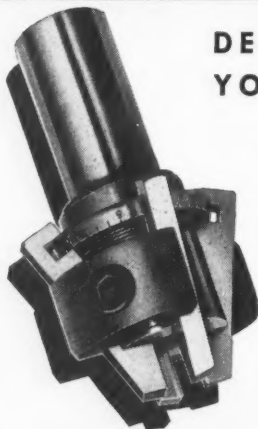
Hy-Tin is said to be capable of clinging



Operator is shown applying "Hy-Tin" Solder Paste to heated metal sheet.

to any object and is applied with steel wool, a damp cloth, or a brush. The paste is supplied in 1½-lb. cans.

KUTMORE ADJUSTABLE HOLLOW MILLS



DESIGNED FOR ALL YOUR HOLLOW MILLWORK

● ANY COMBINATION OF . . . TURNING . . . TAPERING . . . FACING . . . CHAMFERING . . . TREPPANNING IN **ONE PASS.**

● EXCLUSIVE **MICROMETER** ADJUSTMENT FEATURE FOR RAPID SET-UP.

● CUTTING CAPACITIES FROM 1/32" TO 2" DIAMETER IN STANDARD STOCK. IMMEDIATE DELIVERY.

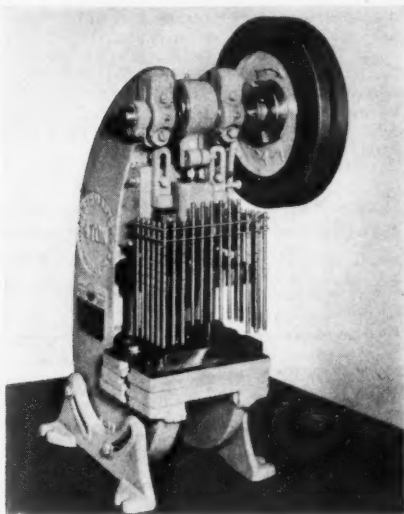
WRITE FOR CATALOGUE No. 20 MM

OUR ENGINEERING DEPARTMENT IS AT YOUR DISPOSAL ON YOUR HOLLOW MILL PROBLEMS

CARL WIRTH & SON, INC. 1625 CLINTON AVE. NO. ROCHESTER 5, N. Y.

Universal Punch Press Guard Provides Safety Regardless of Die Used

Benchmaster Mfg. Co., 1835 W. Rosecrans Ave., Gardena, Calif., has announced a barrier-type punch press guard which is designed to provide maximum operator safety regardless of the die used. The design of the guard is simple and flexible. By dropping numerous vertical rods (the number depends on the size of the bolster plate) through any pair of



Benchmaster Universal Punch Press Safety Guard

prelocated holes in horizontal guard plates, a protective cage is set up around the die area. Virtually any shaped contour can be formed by simply varying the height and position of the rods in the guard plates. The rods are held at desired heights by means of small clips. To change the pattern for a new die requires only seconds, it is claimed. Openings in the guard can be arranged to permit parts to be inserted or ejected from the die.

According to the manufacturer, the guard can be easily and quickly attached to a wide variety of punch presses and can also be used in conjunction with sweep, pull-out, and two-hand trip guards.

HvH Adjustable Limit SNAP GAGES

for Production & Inspection

- Mechanite Frames
- Strong, Rigid, Non-warping
- In accordance with American Gage Design Standards
- Model for every need
- Model A—0 to 6" Model C—0 to 5 11/16"
- Also special checking anvils made to your specifications

HvH SNAP GAGES eliminate guesswork in checking. No skill required. Just set the snap gages and be assured of accuracy in manufacture and inspector's checking.

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HvH TOOL & INSTRUMENT CO.

150 Lafayette St., New York 13, N. Y.

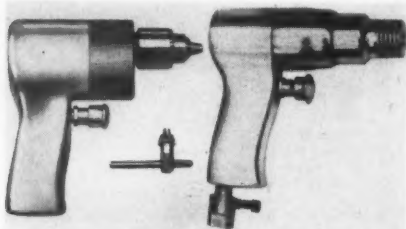
No. S.O. 3787—4-Way Hydraulic Drilling and Tapping Machine equipped with two 10-H.P. Way Type Drilling Units and two 2-H.P. Drill Units. It has a 4-Station trunnion type index fixture with hydraulic actuation. Units are electrically interlocked for control of cycle. **PART:** Motor End Hood. **OPERATION:** Drill and Tap all holes. **PRODUCTION:** 160 per hr.

STANDARD MACHINE AND TOOL CO., LTD.

U.S.A. Sales Representative,
Arnold J. Werner Co.,
New Center Bldg., Detroit 2, Michigan

Pneumatic Drill and Riveting Hammer Feature Lightweight

Brown Tool Mfg. Co., 9422 Trenton Ave., St. Louis 14, Mo., has announced a $\frac{1}{4}$ -inch pneumatic drill and a pneumatic



(Left) Brown Pneumatic Drill. (Right) Brown BXB Pneumatic Riveting Hammer

riveting hammer which feature lightweight. The drill has a speed of 2,600 r.p.m. and utilizes an eight-vane motor which is said to produce a high torque on low pressures. According to the manufacturer, the drill will perform satisfac-

torily at pressures as low as 28 lb., and on pressures of 90 lb. is practically impossible to stall. The motor and gearbox assembly is manufactured as one complete unit. The drill has a polished aluminum offset handle and weighs two pounds.

The pneumatic riveting hammer, designated as the BXB, is said to be light in weight, yet powerful and fast operating from a gentle tap to full power. Air pressure is regulated by means of a simple, interchangeable meter control valve, and foreign particles in the air line, it is claimed, will not interfere with operation. The offset handle is of cast aluminum, and inner barrel, piston, and main valve assembly are of properly hardened tool steel. The hammer delivers approximately 2,800 strokes per minute, has a bore of $\frac{1}{16}$ inch, and a stroke of $2\frac{1}{8}$ inches. The hammer measures 6 inches long, weighs 3 lb., and has a capacity for $\frac{3}{16}$ -inch cold dural rivets.

For further information on any product mentioned in this issue—use the **READER SERVICE CARDS** between the covers.

Your **GUARANTEE OF FASTER SET-UPS**

In making set-ups for tapping and reaming, it is easy to see why the job can be done much faster if you avail yourself of the assistance that a Ziegler Floating Holder will give you.

With the Ziegler you do not have to take the time to complete the set-up to the highest degree of accuracy that is possible. Just come within $1/32$ " of accuracy on the radius, or $1/16$ " on the diameter, and the Ziegler holder does the rest.

Change over to this modern method of making tapping and reaming set-ups and see how much time you'll save.



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for Taps and Reamers...

W. M. ZIEGLER TOOL CO.

13566 AUBURN
DETROIT 23, MICH.

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Simplify LARGE HOLE Tapping

with the New Procunier TAP KING

This lightweight, heavy duty tapping attachment was designed especially for difficult large hole tapping. Rugged, dependable, with a super-tap capacity of $\frac{3}{4}$ " to 1" in steel and up to 1 $\frac{1}{2}$ " in softer materials, the Tap King has been establishing production records. Many users report 50% production increases on large hole tap jobs and costly parts spoilage practically eliminated! And these are not isolated cases! Other users claim more **spectacular** daily production gains. Production men report amazing savings in parts spoilage and consistent, more accurate maintenance of uniform tap depth—even on large **blind hole** tapping jobs! Check these unique features:

Exclusive 17 tooth spline drive from clutch to tap holder spindle, gives smooth, powerful drive, increases tapping accuracy and reduces strain, wear and vibration; new, sensitive yet powerful friction clutch drives tap smoothly, with finger tip control—drastically reducing operator fatigue resulting in more work in less time with less effort; ball and needle bearings assure longer, trouble-free life; reverse speed is twice forward speed; simplified oiling system; aluminum housing; PLUS many other unusual features. **Write TODAY for circular.**

PROCUNIER SAFETY CHUCK CO.,
12 S. Clinton St., Chicago 6, Ill. Dept. 11

Gentlemen: Please send me full details on the new Procunier "TAP KING" Heavy Duty Tapping Attachment.

Name

Address

City Zone State



NEW! LARGE!

"TRU-GRIP" Tap Holder
Makes tapping easier close to walls or shoulders, eliminates "chewed" tap shanks. Lighter, smaller in diameter, it drives the tap by the square, holds it true by the round.

Procunier

Safety Chuck Company

12 S. CLINTON ST. CHICAGO 6, ILL.

NEW SHOP LITERATURE

Composite Die Sections. Allegheny Ludlum Steel Corp., Forging & Casting Division, Dept. MS-39, Wanda & Jarvis Aves., Detroit 20, Mich., has published a booklet containing complete data on 35 standard die sections, from combinations of which thousands of die shapes can be made. Full information on special die sections and instructions on how to order are also included.

Castings for Machine Parts. A six-page two-color folder describing Colmonoy castings for machine parts that must resist wear, corrosion, impact, indentation, and high temperatures has been announced by Diamonds & Tools, Inc., 19345 John R St., Detroit 3, Mich. Standard castings for the metal-working industry illustrated in the folder include lathe and grinder center tips, centerless grinder tips, and chuck jaw inserts. Special Colmonoy castings, including wear strips, wear pads, machine gibs, valve balls, valve seats, and chuck jaw inserts, are also illustrated.

Hole Punching Units. A 16-page four-color catalog (No. CJ) released by Wales-Strippit Corp., 398 Payne Ave., North Tonawanda, N. Y., fully describes and illustrates its Wales Type "CJ" Hole Punching Units for punching mild steel up to 1/4-inch thick. Information on various setups, T-slotted plates, and accessories for stamping press setups is included in the catalog. Data on the Wales Type "NJ" Notching Units for punching and notching setups are also provided.

All-Purpose Pulley Lagging. A six-page two-color illustrated folder issued by Condersite Engineering Corp., 2015 Chancellor St., Philadelphia 3, Pa., fully describes its waterproof and standard types of pulley lagging which are said to be weather and corrosion resistant and unaffected by sulphuric acid, oxidizing agents, soaps, alcohol, and petroleum products.

Vertical Chucking Grinders. The Bulard Co., Bridgeport 2, Conn., has released an eight-page two-color bulletin fully illustrating and describing its line of vertical chucking grinders which are available in 30, 36, 42, 54, 64, and 74-inch sizes. Information on the flexibility, control, rigidity, accuracy, lubrication, and safety of the grinders is included.

"Experience with Shaped Diamond Tools," a four-page reprint released by Industrial Diamond Engineering Co., 870 58th St., Brooklyn 20, N. Y., tells of the problem faced when machining a workpiece of aluminum alloy 43 with high silicon content. Line drawings and tables are included.

"Cleaning and Maintenance of Clad Steel Equipment," a guidebook released by Lukens Steel Co., 517 Strode Ave., Coatesville, Pa., points out the small amount of maintenance and low-cost cleaning necessary for stainless and nickel alloy equipment. The guidebook outlines for maintenance personnel recommended cleaning procedures for those types of surface contamination which are potentially harmful. Solution formulas for cleaning specific kinds of surfaces and information on handling clad steel equipment during relocations are included.



Monarch Precision SHAPLANE Radius Tools

Illustration shows convex cutter for 1/4" to 2 1/2" balls.

FIVE MODELS for LATHES, SHAPERS, PLANERS, BORING MILLS

Range 1/2" to 3" for concave Radii. Also heavy duty models for radii to 6" on planers, etc.

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4470 Oakenwald Ave., Chicago 15, Ill.

Reamers. Lavalley & Ide, Inc., Chicopee, Mass., has released a 1953 catalog illustrating and describing its line of quality ground reamers. An illustrated price list on the reamers is also available.

High-Speed Counterbores and Spot Facers. A 20-page two-color booklet released by Union Twist Drill Co., Butterfield Division, Derby Line, Vt., fully describes and illustrates its line of high-speed counterbores and spot-facers with interchangeable pilots, including aircraft styles, which are designed for adaptability to a wide variety of operations. Complete specifications, tips on efficient cooling, suggested selections in cutting fluids, and a decimal equivalent chart are included.

Portable Power Saw Cutting Applications. Skil Corp., 5033 Elston Ave., Chicago 30, Ill., has published a 24-page illustrated manual pertaining to cutting applications with a portable power saw. The booklet lists 30 different materials and the most effective method of cutting them with a portable power saw. Information on proper blade selection and proper cutting techniques, helpful hints, and suggestions are included.

High-Speed and Carbon Twist Drills. A 12-page two-color illustrated catalog released by Precision Twist Drill & Machine Co., 5023 W. Armitage Ave., Chicago 37, Ill., provides complete specifications and price lists for its line of high-speed and carbon straight shank twist drills and drill blanks which can be supplied in sizes as small as 0.006 inch in diameter. Information on reamer blanks made of high-speed steel is also included.

Lathes. A 46-page illustrated manual (Publication S-104) released by Cincinnati Lathe & Tool Co., Cincinnati 9, Ohio, contains data on the installation, operation, and lubrication, as well as exploded view parts listings, of its improved Model LT Cintilathes. Information, exploded views, and parts listings pertaining to older design Cincinnati lathes is also provided. Line drawings are included.

Clutches. A six-page two-color illustrated folder released by Formsprag Co., 23587 Hoover Rd., Van Dyke, Mich., fully describes its line of clutches which are designed for over-running, indexing, and backstopping. Four pages of engineering data and an application sheet accompany the folder.



FREE

Jar of PROTECT-O-METAL No. 2, the smokeless, odorless, non-toxic, spatterproofing compound that lets you wipe off weld-spatter—save 85% of cleaning time and labor. Write for your free sample today!

PROTECT-O-METAL
POM

G. W. SMITH & SONS, INC.  **5407 KEMP RD., DAYTON, O.**

Wall Chart. Ace Drill Corp., Adrian, Mich., has prepared a convenient 11 x 14-inch wall chart for use in toolrooms and other locations where drills are used or specified. The chart consolidates fractional, wire, letter, and millimeter sizes into one consecutive listing, in numerical order of their decimal equivalents. The chart covers the complete range of 327 drill sizes from 0.0135 to 1 inch in diameter.

Bronze Welding Rods. A six-page three-color illustrated folder issued by Titan Metal Mfg. Co., Bellefonte, Pa., provides information on the chemical and physical properties of its bronze welding alloys. The folder shows the latest A.S.T.M., A.W.S., Federal, and Navy specifications for bronze welding rods.

Carbon Steel. Peter A. Frasse & Co., Inc., 17 Grand St., New York 13, N. Y., has issued a file-card size, cardboard chart which shows chemical analysis requirements for each of 60 military, army, navy, aeronautical, and federal specifications of carbon steel. Also listed are specified forms (sheets, bars, and so on) and the nearest corresponding S.A.E., A.I.S.I., and A.M.S. type numbers.



PRECISION AIDS FOR JIG BORING

"TAP-GO" SPRING CENTER
Perfectly tapped holes, No. 0 and up, to finest jig boring tolerances. **\$7.50**

"ZERO" EDGE LOCATOR
Simplifies rapid centering of spindle over edge of work to TENTHS. **\$10.00**

Dealer inquiries invited.

The medelton Company, Inc.
335 EAST 142ND STREET
BRONX 54, N. Y.

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Thread Gages. A four-page two-color brochure published by Standard Thread Gage Co., 26538 W. Seven Mile Rd., Detroit 19, Mich., describes and illustrates its line of thread plug and thread ring gages. Complete specification tables on thread ring and setting plug gages and thread work plug gages are included.

Resistance Welding Equipment. A 24-page two-color catalog (No. RW-1a) issued by Ampco Metal, Inc., 1745 S. 38th St., Milwaukee 46, Wis., describes and illustrates Ampco-Weld Resistance Welding Equipment, including tips, holders, seam welder wheels, seam welder shafts and bushings, and flash, butt, barrel, and projection welding dies. Reference tables and comparative charts giving physical properties, applications, and R.W.M.A. specification data are included.

Comparators. A four-page two-color bulletin (No. 30) issued by Magnetic Analysis Corp., 42-44 Twelfth St., Long Island City 1, N. Y., describes and illustrates production and single-frequency comparators for inspecting ferrous materials or parts and a dual-frequency comparator for inspecting both ferrous and non-ferrous metals.

Illuminated Magnifier. A four-page two-color bulletin issued by E. W. Pike & Co., 492 North Ave., Elizabeth 3, N. J., describes and illustrates its "Flash-O-Lens" Illuminated Magnifier which is a portable instrument designed for a wide variety of inspection operations. Complete specifications and prices of the various models available are included in the bulletin.

Microcast Movie Folder. A four-page colored folder issued by Microcast Division, Austenal Laboratories, Inc., 7001 S. Chicago Ave., Chicago 37, Ill., presents complete information on how to obtain a color motion picture film entitled "Microcast, a Story of Industrial Progress," which explains the development and uses of the Microcast process of precision investment casting.

Pressure-Testing Machine. A two-page bulletin (No. 103-37), describing a pressure-testing machine which is said to detect and locate leaks in automotive engine exhaust manifold castings, has been published by Modern Industrial Engineering Co., 14230 Birwood, Detroit 4, Mich. An illustration of the machine, complete operating description, and specifications are included.

Gear Wire Formula. Size Control Co., 2500 W. Washington Blvd., Chicago 12, Ill., has issued a catalog (No. 53) which provides complete information on its gear wire mathematical formula that is said to make it possible to figure the correct wire sizes for both spur and helical gears. The formula, it is claimed, can be used by all gear manufacturers and others for quality control of purchased gears and for gear maintenance accuracy.

Centrifugal Pressure Blower. An eight-page two-color catalog (No. K-100) issued by Eclipse Fuel Engineering Co., Rockford, Ill., fully describes and illustrates its centrifugal pressure blower which is said to provide a constant, dependable air supply for all types of combustion equipment. Information on features, capacity and pressure tables, specifications and dimensions, line drawings, and data on applications are included.

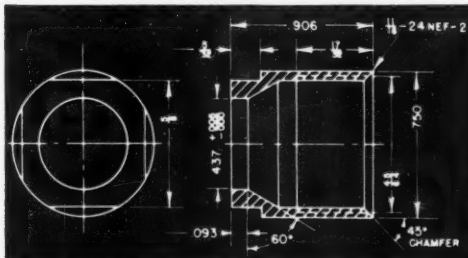
"Marvic Machinists Operating Manual," a 38-page pocket-size illustrated booklet released by Marvic, Inc., 350 Peninsular Ave., San Mateo, Calif., describes the operation of the Marvic System which is said to provide an entirely new approach to the problem of holding cutting

tools for lathe operations. The booklet includes data on the history of the system; the construction, operation, and mounting of the Marvic multiple tool block; Marvic System toolholders; and the advantages of the system. Tables are also provided.

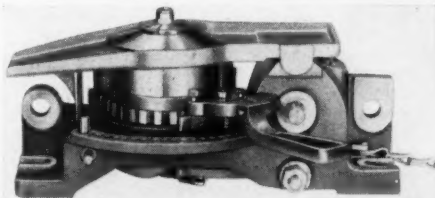
Engine and Production Lathes. A six-page two-color folder (No. 542) released by Morey Machinery Co., Inc., 410 Broome St., New York 13, N. Y., fully describes and illustrates Mondiale engine and production lathes. Complete specifications are provided for each type of lathe, and information on features is also included in the folder.

Welding Manuals. Two welding manuals, "Eureka Tool and Die, or Maintenance Welding in the Forge Shop" which deals with specialized welding in the forging industry and "Eureka Tool and Die Welding Guide" which is devoted to the entire tool and die welding field, have been issued by Welding Equipment & Supply Co., 223 Leib St., Detroit 7, Mich. Both manuals illustrate various applications of the metallic arc, atomic hydrogen, and atomic arc phases of welding.

CUT COSTS ON SECONDARY OPERATIONS WITH THE DEARBORN AUTOMATIC CHUCKING AND INDEXING FIXTURE



This piece made from 17 ST Aluminum. It was necessary to straddle mill the four flats as shown. Production was approximately 1000 pieces per hour.



- Work is held by collets which grip round, hexagon or square shapes up to 2" dia. Collets are opened and closed automatically by the forward and backward motion of milling machine table or drill head. Work is automatically ejected from collet after last cut by bringing machine table back further.

Write for complete details.

J. W. DEARBORN
ANSONIA • CONN.

Precision Lathes. A 12-page two-color catalog (No. 5216) released by South Bend Lathe Works, 425 E. Madison St., South Bend 22, Ind., describes and illustrates its Light Ten Lathes, bench and floor types, in the quick-change gear and toolroom models. Information on outstanding features is provided, and specifications are given for the various models covering capacity, feeds, and speeds, as well as dimensions and shipping weights. Data on a wide selection of attachments and accessories are also included.

Hydraulic Drill Units. A 20-page illustrated catalog (No. AD 723) released by Delta Power Tool Division, Rockwell Mfg. Co., Dept. DC-H29, 400 N. Lexington Ave., Pittsburgh 8, Pa., contains extensive engineering data that provide a comprehensive coverage of the operation, capacity, available drive arrangements, and power regulation of all Delta hydraulic drill units which have an infinitely adjustable spindle travel of $1\frac{1}{2}$ inches for the smallest and up to 6 inches for the largest unit. Charts showing the proper gear ratio, pulley drive, and motor needed for a particular application, as well as line and schematic drawings, are included.

V-Belts. A fractional horsepower V-belt catalog for servicing light-duty applications has been released by Raybestos-Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J. Belts are listed according to the new industry-standard numbering system.

Fixture Clamps and Components. West Point Mfg. Co., 26939 W. 7 Mile Rd., Detroit 19, Mich., has issued a 64-page catalog describing its line of fixture clamps and components. Information on 15 styles of clamps in 100 sizes, and over 350 fixture components is included.

Industrial Chilling Equipment. A 12-page brochure on chilling for alloy steel heat treatment, metal stabilization, gas dehydration, and parts and material testing has been published by Sub-Zero Products Co., 3932 Reading Rd., Cincinnati 29, Ohio. Data on the specific treatment of heat-cold cycles for the transformation of austenite to martensite are provided for water and oil-hardening tool steel, alloy-carburizing steels, high-alloy die steels, and high-speed and moly-type steels. Various standard Sub-Zero units for low temperature industrial and laboratory chilling are illustrated and described and detailed specifications are provided. Chilling equipment for special applications is also illustrated in the brochure.

Plastisols. Houghton Laboratories, Inc., 322 Bush St., Olean, N. Y., has announced a four-page two-color bulletin describing the Hysol 3000 Series Plastisols which are dispersions of high molecular weight polyvinyl chloride resins in selected liquid plasticizers for corrosion protection, abrasion resistance, and electrical insulation. The bulletin contains illustrations of various applications; specifications; data on formulation procedure; and information concerning application techniques, including dipping, spreading, and casting methods.

Correction

The spindle speed range of the Werner No. 5 and No. 6 Vertical Millers is 16 to 1800 r.p.m. and not 1600 to 1800 r.p.m. as given in the Marac Machinery Corp. advertisement appearing on page 59 of the March issue.

For Your Convenience...

the "Where to Get It" section of MODERN MACHINE SHOP, originated in February, 1940, provides a quick reference to machinery, tools and supplies advertised in the current issue. Use it consistently. You'll find it's very helpful. (See pages 416, 418, 420, and 422.)

MODERN MACHINE SHOP

431 MAIN STREET • CINCINNATI 2, OHIO

Design
with a \$ sign —
(for savings in initial cost)

the new WALKER-TURNER
LIGHT-HEAVYWEIGHT
Drill Presses

The new Walker-Turner Light-Heavyweight line gives industry the capacity for short-run production work, without the necessity of heavy investment. It's designed with a dollar sign, representing money saved. Walker-Turner makes 15" and 20" Drill Presses (in Bench, Floor, and Production models), as well as Radial Drills. Send for complete information. Simply write name and address in margin below.

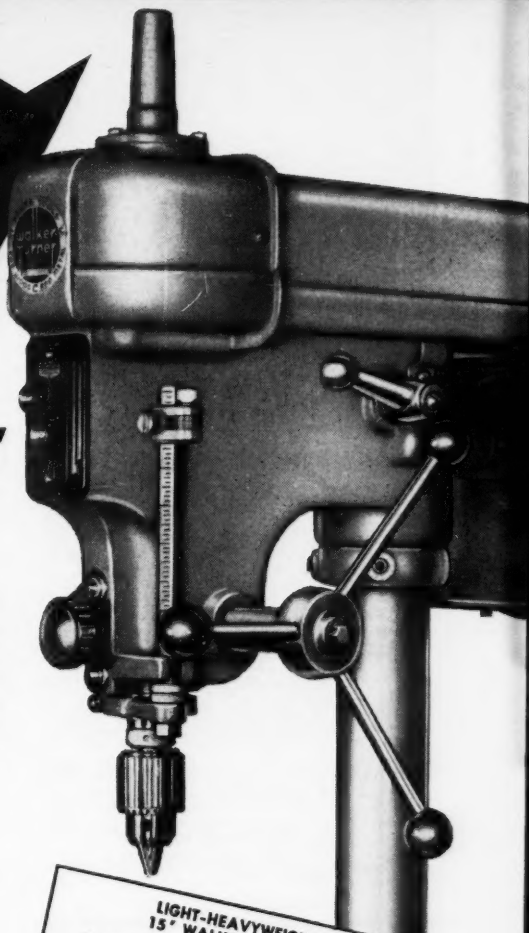
WALKER-TURNER
DIVISION
KEARNEY AND TRECKER CORPORATION
PLAINFIELD, N. J.

DRILL PRESSES — HAND AND POWER FEED • RADIAL DRILLS
WOOD AND METAL CUTTING BAND SAWS • TILTING ARBOR SAWS
RADIAL SAWS • JIG SAWS • LATHES • SPINDLE SHAPERS
JOINTERS • BELT AND DISC SURFACERS • FLEXIBLE SHAFT MACHINES

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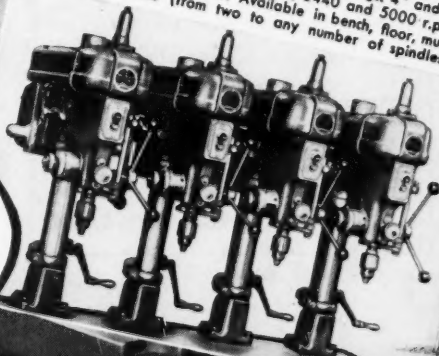
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to write for full details and specifications.
Walker-Turner Division, Kearney & Trecker Corp.
Dept. MM-4, Plainfield, N. J.
(Please write your name and address in margin of page.)



**LIGHT-HEAVYWEIGHTS "IN LINE" —
15" WALKER-TURNER DRILL PRESSES
PRODUCTION MODELS**

Designed for fast, accurate drilling at new low levels of investment and production costs. Features calibrated depth indicator. Capacity: 4 spindle Production Model (shown) — 18½" chuck to table, 7½" center of chuck to column. Six spine spindle mounted on 2 ball bearings. 4" and 6" travel. Four speeds — 600, 1250, 2440 and 5000 r.p.m. with 1750 r.p.m. motor. Available in bench, floor, multi-spindle models (from two to any number of spindles.)



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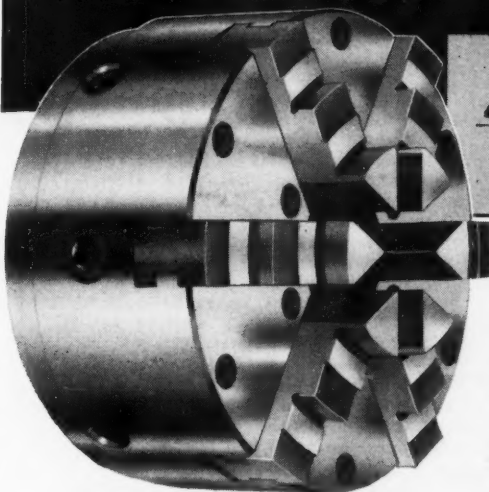
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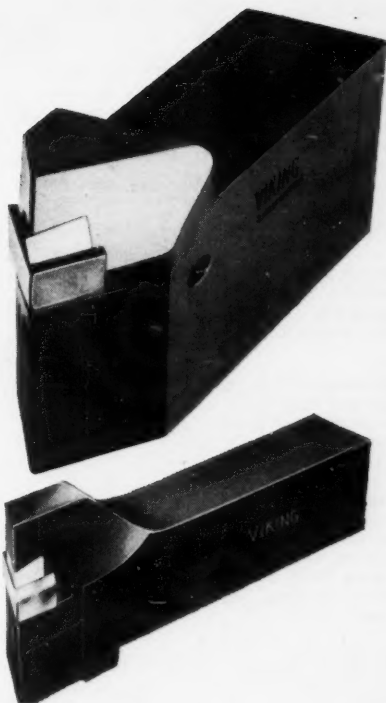
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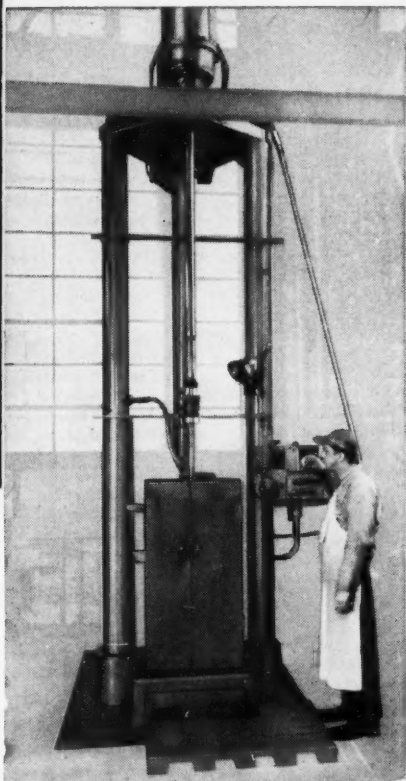
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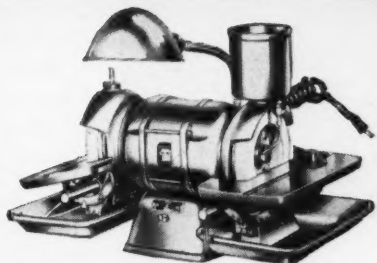


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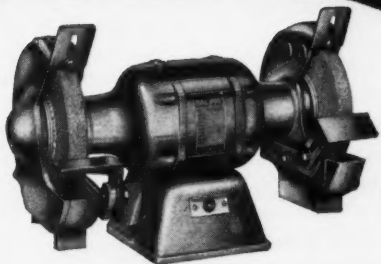
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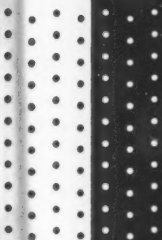
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the last word

Development Takes Time

Generally, when we look back over changes which have been made in manufacturing techniques, we are inclined to think of them as having come about quickly, when as a matter of fact, the changes actually occurred gradually and only after many years of patient trial and error did they become an actual part of accepted industrial practice. The use of individual motor drives for machine tools, the production line method of manufacturing and assembling are but two examples of ideas which were subject to long and tedious experimentation before being generally accepted. Today, we could unhesitatingly place the "automatic plant" in this category. While a considerable amount of experimental work lies in the past, more work today and in the future will be required before the idea is completely workable.

At the meeting of tool engineers in Detroit last month, Ralph E. Cross, executive vice president of The Cross Company, described an automatic machine line 300 feet in length, consisting of five Transfermatic machines which perform 495 machining operations and 106 inspection operations. The grouping of machines to-

gether provides for the processing of more than 100 engine blocks at one time.

Theoretically, this type of setup would seem to be ideal in that it would satisfy high production requirements, but unfortunately, the problem of downtime for changing tools has yet to be solved. Downtime, according to Mr. Cross, accounts for more than 75 per cent of all lost production time on equipment of this type.

Looking toward the future, Mr. Cross predicts that the machine of tomorrow will decide when it is time to change tools, and it will use the information to automatically bring a fresh set of tools into operation without any lost production time or assistance from the operator. That this problem, like so many others that confront developers of equipment of this type, ultimately will be solved, we have little doubt. But it will take time.

o

Markets Unknown

Those of us who might feel inclined to worry a bit over possible excess manufacturing facilities and potential should the military requirements either gradually or suddenly be cut back may derive some

consolation from recent studies of population trends. Some twenty years ago it was believed that the United States would achieve its full population growth by the year 1960—a peak of some 157 millions—and then our population would level off and remain pretty much the same for years and years.

Our population figure passed the 157 million estimate last July, according to the U. S. Chamber of Commerce, and there seems to be no limit to how big we can grow. Even the most conservative experts say that by the year 2000 there will be 200 million people in this country. Others place the figure as high as 300 million.

Manufacturers of metal products can draw one important conclusion from a study of these figures. As our population expands, they will be called upon to provide more and more of their products. No one can say how many millions more of baby carriages, toys, new houses, automobiles, radios, television sets, air conditioning systems, trains, airplanes, trucks, household appliances and other commodities we will need to satisfy the needs of a larger and larger population.

We do know, however, that our expanding population has an insatiable appetite for the products of our factories and that the wants of tomorrow cannot be measured by the demands of today.

For Peacetime Production

From a recent issue of Machine Tool Progress, the official organ of the National Machine Tool Builders' Association, we read the following pertinent comment on advances in the art of cutting metal: "During the present defense program, just as in World War II, great advances have been made in the art of cutting metal.

"Defense products have posed new and difficult machining problems to which machine tool builders have found solutions. The methods thus developed have useful application in the manufacture of peacetime products.

"During much of World War II machine tool designs were frozen. That has not been the case in the present defense period. Research, experimentation and design have been continuous and have been translated into new tools and attachments, new cutting methods and new types of machines, particularly those especially built for specific production jobs.

"New features now available, plus the current lull in defense buying and liberalization of government regulations, give rise to the expectation that the buying of machine tools for civilian production will continue, as the year progresses, on an accelerating basis."

Fred W Vogel

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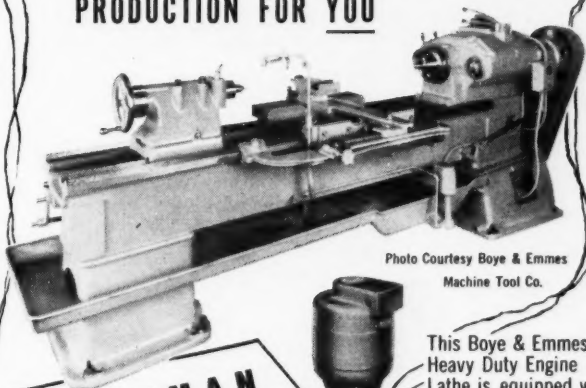


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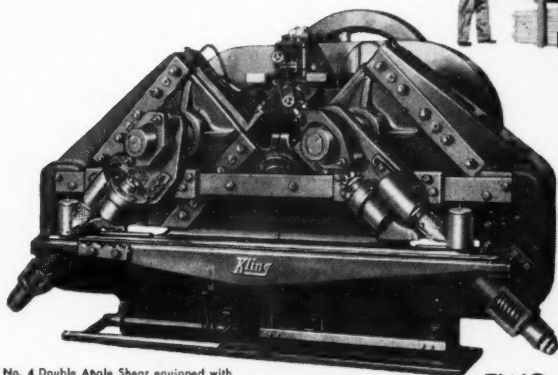
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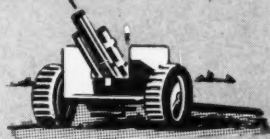
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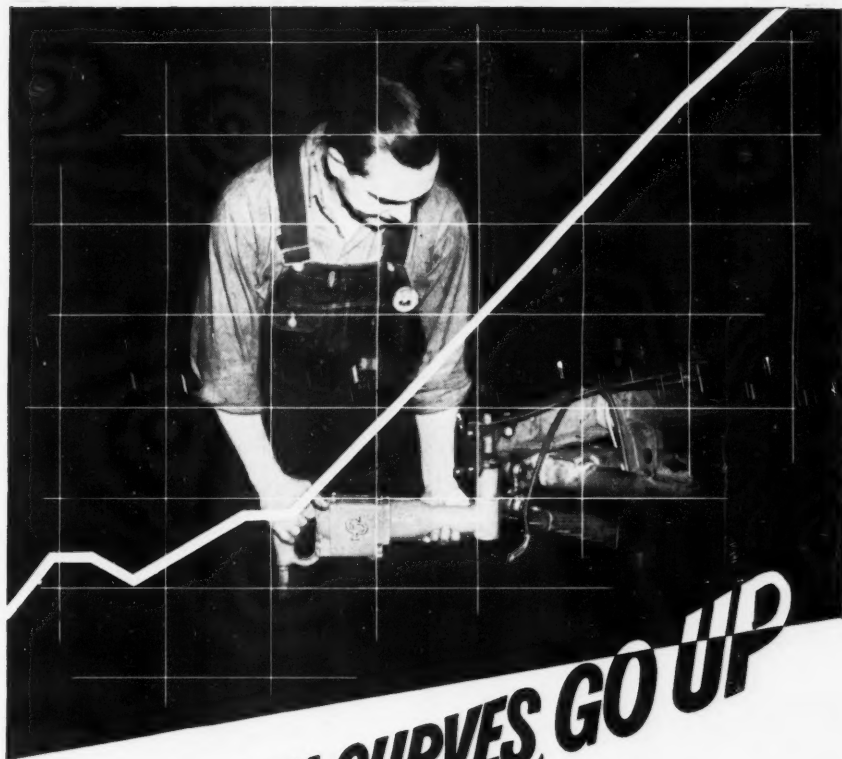
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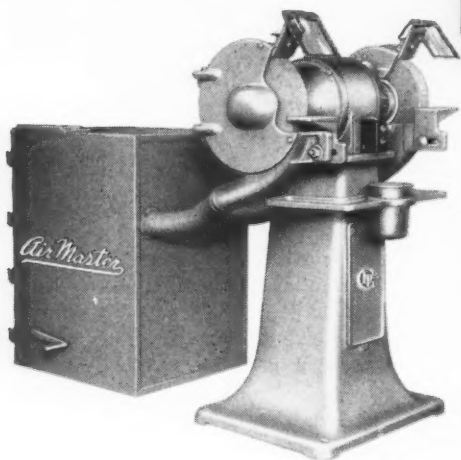
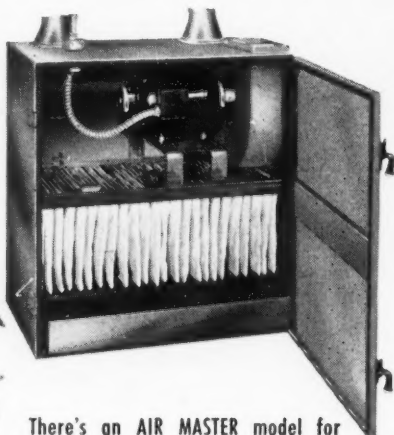
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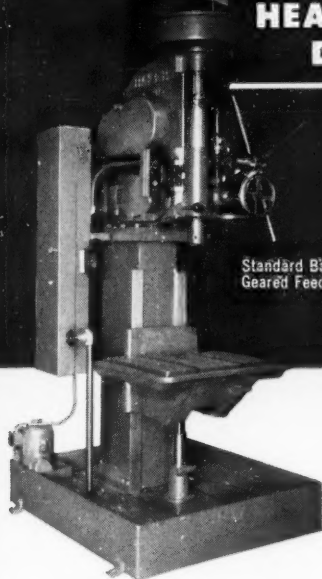
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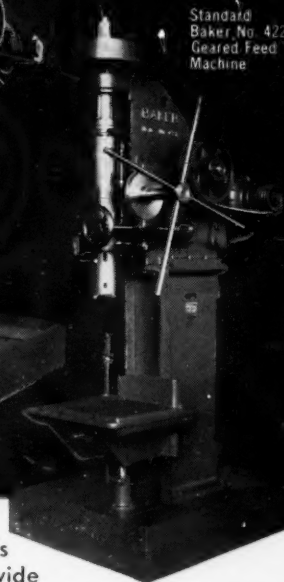
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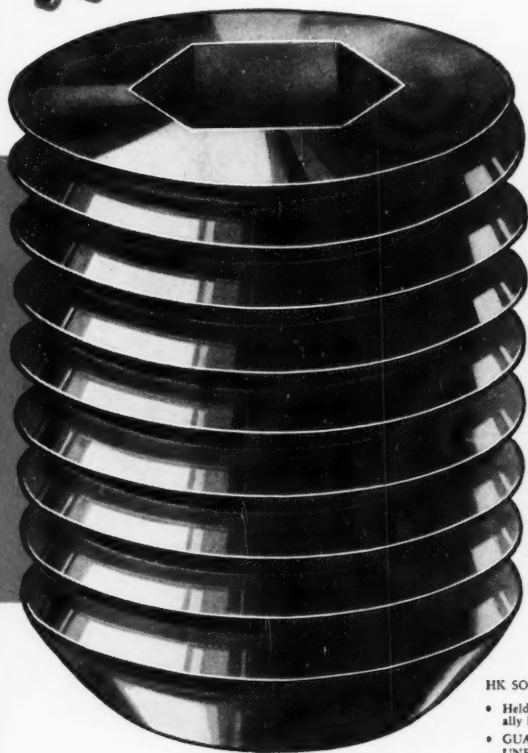
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2. Max. H. P. Motor used	10	15	20
3. Distance center of Spindle to Frame (Gap) *	12-1/4"	12-1/4"	12-1/4"
4. Maximum Spindle Travel	12"	16"	16"
5. Spindle—Outside Dia. splined driving end	2"	2-13/16"	3-1/4"
6. Dia. of Spindle Sleeve	3-1/4"	4-1/4"	5-1/4"
7. Dia. of Spindle Nose	3.225	4.225	5.225
8. Morse Taper in Spindle as standard	No. 5	No. 5	No. 6
9. Standard Speed Range in R.P.M.	76-614	27-220	20-165

*Can be increased 3" by use of offset Spacer Block.

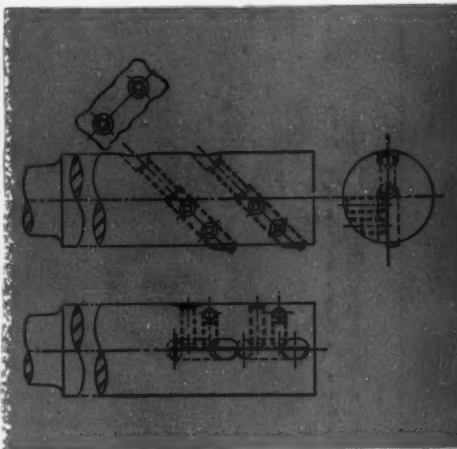
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